THE POLAR TIMES

Spring-Summer 2003

The President's Letter

As a means of reaching our membership following the recent election, I want to thank those who thought I should be the next president and wish everyone well. As I understand it, there was no need to conduct an election investigation by counting "chads" or appeal to the Supreme Court, which simplifies everything. One of my campaign promises, by the way, was not to declare war on anyone.

I am sure you are all aware of the financial straits that non-profit organizations are in and probably have been in for some time. I am pleased to report that the situation with our Society is comfortable, thanks to past efforts by Society officials. But I want to let you know of a proposal to boost our budget and also support the scheduled Symposium in October. First of all, I want to send a personal thanks to those who responded to the annual dues notice last October by sending generous donations. They are very much appreciated.

Inserted in this issue you will find an announcement for the October Symposium of the Society, to be held at the Byrd Polar Research Center, Ohio State University, Columbus. As a means of assisting with costs for the Symposium, a number of sources—corporate and other—are being contacted for support. I am proposing that an additional source is the membership itself.

Membership dues are barely sufficient to cover operating expenses of producing *The Polar Times*, to say nothing of adding an extra budget expense of sponsoring and hosting a Symposium. The registration amount for this year's Symposium was raised in an effort to combat the shortage and also to account for inflation, a word that continues to haunt everyone when budgets are discussed.

Rather than assessing an additional charge above membership dues, I propose a voluntary donation from those members who are in a position to assist. You who are members of professional and other societies are aware of this method of augmenting the budgets of those societies. Any amount would be appreciated, but a suggestion follows for those who are unable to attend the Symposium. With registration for those attending currently set at $125, a proposed amount up to $100 for those NOT attending would help the Symposium budget immensely. The book of abstracts would be mailed to you when it is available at the time of the Symposium, as well as a generous thank-you for the support. Those who plan on attending the Symposium are welcome to contribute as well, of course, and the amount for any member to consider is optional. The American Polar Society is a tax-exempt organization as defined by Sec 501 (C)3 of the IRS code. Donations can be made by check to Bob Kremenak at American Polar Society Membership Center, P.O. Box 464, Iowa City, Iowa 52244-0464. If you have questions, send an email message to ampolars@mchsi.com.

It was not an easy decision to raise the registration fee this year from $100 to $125, but present times show no mercy. To keep our membership dues and future symposia at reasonable costs, this is the time to look for donations that will keep the Society healthy. Your help in this event is appreciated.

It will not be easy to fill the shoes of our preceding president, Dr. Gisela Dreschhoff, whom I first met and remember from her beginning research projects in the U.S. Antarctic Program in 1975. But through the years, we have collaborated in authoring a volume on Antarctic mineral resources (published by the American Geophysical Union), worked on different projects out of remote helicopter field camps in Antarctica in the 1970s and 80s, and now I find her help in these times of transition immensely helpful. I have recently come out of an academic career for 20-some years (Ohio State University, University of Nebraska, University of Minnesota) and wound it up with teaching geology at a small undergraduate college in Maine, College of the Atlantic, in Bar Harbor. Perhaps none of that prepared me for helping all of you with maintaining the Society at the high level it has experienced for many years, but polar field work beginning in 1960 gave me a feeling for what it's about. Thank you, Gisela, for all your help, and for the others in our administrative structure. The Society is only as strong as its members, and polar people are as good as it gets.

Your help is appreciated.

Best wishes,

John Splettstoesser

ABOUT OUR FRONT COVER

View of the west bank of the Colville River, NE of Umiat, where heavily stratified Cretaceous sediments are gently folded, and punctuated by a number of volcanic ash layers. These strata contain some of the world's premiere dinosaur fossil beds and trackways. See articles by Sonya Senkowsky, Roland Gangloff and A.R. Fiorillo. (Photo by A. R. Fiorillo.)

American Polar Society

The American Polar Society was founded Nov. 29, 1934, to band together all persons interested in polar exploration. Membership dues are $15 a year ($17, foreign), and entitle members to receive ***The Polar Times*** twice a year. The American Polar Society is classified as a tax exempt organization under Sec 501(C)3 of the IRS Code. For more information about the American Polar Society, contact **Capt. FRANK STOKES, APS Secretary,** at 1.850.497.0759 or send email to *sto346@yahoo.com*.

FOUNDER • August Howard

PRESIDENT • John Splettstoesser

VICE PRESIDENTS

Dr. Richard L. Cameron • Dr. John H. Roscoe • Dr. James Collinson

SECRETARY • Capt. Frank Stokes

TREASURER • Capt. David E. Baker

BOARD OF GOVERNORS

Billy-Ace Penguin Baker • Col. Peter Barretta • Sheldon Bart • Dr. Charles R. Bentley • Capt. Lawson Brigham • Dr. Richard L. Chappell • Walter H. Dodd • Dr. Donn K. Haglund • Dr. Charles R. Kremenak • Capt. David C. Nutt • Charles E. Passel • Dr. Martin A. Pomerantz • Michele E. Raney, M.D. • Mrs. Edith Ronne • Jeffery C. Rubin • Dr. Robert H. Rutford • Dr. Alan H. Shapley • Ms. Lynn Tipton-Everett • Captain W.E. West •

The Polar Times

Spring-Summer 2003, Vol. 3, No. 3

EDITOR: Capt. Cliff Bekkedahl, USN (Ret.)
908.232.7210 • cv1957@comcast.net

ARCTIC EDITOR: Dr. David Norton
907.479.6898 • arcrim@ptialaska.net

ANTARCTIC EDITOR: Mr. Jeff Rubin
860.345.0944 • rubinwiles@worldnet.att.net

CONTRIBUTING EDITORS

Billy-Ace Penguin Baker, RMC, USN (Ret.)
Colonel Peter Barretta, USAF (Ret.)
Mr. Peter Anderson
Brian Shoemaker, USN (Ret.)

PRODUCTION EDITOR: Ms. Charlotte Sinclaire
336.376.5566 • c_sinclaire@msn.com

Secretary's Letter

My letter to the membership this issue has the main purpose of reminding you of the upcoming symposium in Columbus, Ohio, in October. Inserted in this issue you will find a sheet detailing the fine program the APS has organized for you. The APS staff, with the help of the women at the Byrd Polar Research Center and the able leadership of Kristen Larson and Julie Palais, have organized an outstanding agenda that is well worth your participation. The subject is of great importance to our members: "Women's Role in the Polar Regions, Past, Present, and Future."

Meanwhile, Dr. John Splettstoesser, our new president, has assumed his duties with vigor and called for a program of voluntary contributions to the APS to help meet our rising financial obligation and hold the line on dues. If you can help with this worthy cause, please do.

As many of you know, I have been laid up with a broken hip these past weeks. I had attended a dinner in Chicago for one of our former astronauts when I had the bad grace to fall on the ice while on my way home.

I'm now 90 percent recovered, lacking only my doctor's agreement that I can put weight on the leg in question.

Thanks to an outstanding and self-sufficient staff, the APS functioned as usual. I was able to to follow all developments on the Internet and felt no reason to intervene. (I'm a great believer in the philosophy, "If it ain't broke, don't fix it.")

One final note: My email address is still Sto396@yahoo.com. At one point early on, someone hacked into my Yahoo account and used it to then place orders on Ebay in my name. The crime was quickly discovered, but for a week or two my mail was interrupted and, in some instances, returned when Yahoo closed my account for a week while we sorted out the mess. If any mail was returned to you, please resend it.

Thank you.

Frank Stokes

Congratulations to these newly elected officers and governors of The APS:

President—John Splettstoesser
First Vice President— Dr. Richard Cameron
Second Vice President— Dr. John Roscoe

Board of Governors

Billy-Ace Penguin Baker, RMC, USN (Ret.)
Dr. Robert H. Rutford • Dr. Donn K. Haglund
Ms. Lynn Tipton-Everett • Dr. Charles R. Kremenak
Captain W. E. West, USCG (Ret.)

The Polar Times

American Polar Society • Spring-Summer 2003 • Vol. 3, No. 3

Northern Alaska, A Crucible for Science

By Roland A. Gangloff

" Snow-peaks and deep gashed draws
Corral me in a ring
I feel as if I was
The only living thing
On all this blighted earth;
And so I frounst and shrink
And crouching by my hearth
I hear the thoughts I think
I will not wash my face,
I will not brush my hair.
I "pig" around the place—
There's nobody to care,
Nothing but rock and tree
Nothing but wood and stone.
Oh, God it's hell to be
Alone, alone alone."

This is the lament of a field geologist exploring for oil on the north slope of the Brooks Range and the Arctic Coastal Plain of northern Alaska. It reflects the physical and mental demands that this expansive and rugged area exacts from field geologists, paleontologists, and wildlife biologists.

These thoughts were penned by Dr. Robert Liscomb, circa 1961. He died in August of 1962 in a fall from a cliff on Middleton Island in the Gulf of Alaska. Except for one collection of fossils that Liscomb made in 1961 along the Colville River on Alaska's Arctic Coastal Plain, Robert Liscomb's name might have slipped into disuse, along with names of other field geologists who tramped over and mapped thousands of square miles along many of the rivers and shorelines of northern Alaska through the 20th century. As a geologist, specifically a paleontologist, drawn to northern Alaska by the excitement and challenges that Robert Liscomb's Colville collection initiated, I marvel at the natural wonders that challenge the geoscientist in this great land, which acts as a crucible for researchers and the State of Alaska.

I have just completed my 16th year of exploration and research on Arctic dinosaurs, spurred on, despite many frustrations, by a mantra that a colleague from Australia suggested. In 1988, Dr. Thomas Rich met me on the Colville River near what has become known worldwide as the Liscomb bonebed. After a week of work and travel along the river he declared, one evening at the campfire, "My god, this place is another Red Deer River." Quite possibly a vertebrate paleontologist's Eldorado was what he was implying. The Red Deer River of Alberta cuts through the richest Cretaceous age fossil beds in North America. Over a hundred years of work has produced the greatest variety of dinosaurs and related fossil reptiles yet to be found in North America. Whenever discouraged by the weather, river conditions, fossils that were difficult to extract, or scarceness of research support, I can think of the Red Deer River mantra. The fossils are out there, they are out there, they are out there.... The Liscomb bonebed has always seemed a safe haven for me because it never seems to run out of fossils or surprises.

True to Tom's assessment, the last six years of exploration and collection have produced almost a hundred new sites, rich bonebeds, and additions to the list of dinosaurs now known to have lived in the Arctic. Moreover, the first dinosaur trackways were documented at sites along the Colville River at various distances from the Liscomb bonebed. This appears to be just the tip of the iceberg, but it will require the research lifetimes of several paleontologists to see Tom Rich's prediction fulfilled. However it turns out, the record of Alaska's Arctic dinosaurs is bound to change the way we look at these beasts (see the article by A. R. Fiorillo, this issue). My 16 years have been a watershed that have given me a whole new perspective on this part of Alaska.

My experiences in northern Alaska beg comparison with those of a cadre of geoscientists who have left their mark on their science and on the State. Anyone living in the State of Alaska for any time becomes aware of the influence that northern Alaska has on the economy, politics, and even self-image as the "Last Frontier." Central to this effect on every Alaskan's life are the geosciences and the results of individuals' and teams' geological and geophysical research that shaped the economic and political agendas of the State through tireless work over the last century.

It is instructive to consider public forgetfulness, specifically our short memory for geological scientists. Most Alaskans are aware that natural resources, and especially petroleum and coal have become the backbone of Alaska's economy, and that northern Alaska's reserves of oil and natural gas are the determinant that shapes their present and ultimately their future. "Permanent Fund, Prudhoe Bay, TAPS, ANWR, Barrow, Kaktovik, Kukpowruk, Colville River, and NPR-A" are in the lexicon of all Alaskans who follow the news of the world around them. On the other hand, few can identify the names or terms, "Lefingwell, Marshall, Pessel, Mull, Kelly, Tailleur, Mertie, Gryc, Sag River, Umiat, Cretaceous, Lisburne, USGS, PET-4," or their connection to the nine terms in the previous sentence. The names of the geoscientists, the places and acronyms that shaped exploration and led to yearly dividend checks and jobs are unknown to most Alaskans. It's beyond me to fill the knowledge and appreciation gap, but I can summarize some of the history of the more significant work of geoscientists of the 20th century that laid the foundation for my 16 years of research and try to point out some of their important contributions to the shaping of the State and our understanding of the rich geologic heritage that resides within it.

Ernest Lefingwell's name belongs at the head of any list of Alaska geologists, because his work represents the United States Geological Survey (USGS) effort between 1907 and 1921 that established the foundation upon which all subsequent work depended. Leffingwell's style differs from most recent contributors in the last 50 years. Leffingwell single-handedly mapped most of the Arctic Coastal Plain over the 500 km (300 mi) from Barrow to the Canadian Border. His lonely toil relates to the opening poem of Robert Liscomb. Geosciences fieldwork over the last decades is typically conducted by teams of geoscientists working out of base camps where they work for oil companies, the State Survey, or a university.

> *The fossils are out there, they are out there, they are out there....*

The story of the dinosaurs of the Arctic Slope begins in the late 1940s and early 50s (before Alaska statehood in 1959) with the work of mapping geologists working for oil companies and the USGS. The Survey geologists and paleontologists concentrated on the area that is presently known as the National Petroleum Reserve-Alaska (NPR-A). The great bulk of the Oil company geologists and paleontologists worked around the edges of the NPR-A. Because commercial oil companies compete with one another, their data are kept secret in company files. Survey geologists such as T. G. Payne and A. J. Eardley were the first to define a framework model for the geology of the Arctic Slope. This was followed by mapping in the Brooks

(Continued on page 4)

Dinosaurs of Arctic Alaska

By Anthony R. Fiorillo

Alaska's dinosaurs are raising questions about the paleobiology of the animals, and about the meaning of the term, "Arctic." The first dinosaurs to be discovered in Alaska were bones found on the North Slope in 1961 by the late Dr. Robert L. Liscomb, a geologist for Shell Oil Company. Before he could enjoy full credit for his finds, Liscomb died the following year in a climbing accident. His discoveries remained undisclosed for the 20 years that Shell was entitled to keep proprietary geological information from the public. By then, several other finds hinted at widening dinosaur discoveries. Detailed excavation and mapping of the Liscomb Quarry, or bone bed, took form in 1985 with Dr. Roland Gangloff of the University of Alaska Museum playing a key role (see his accompanying article, p. 3).

By the early 1990s, two points of significance had emerged from the collective discoveries. First, our understanding of the physiology and ecology of dinosaurs was problematic given these high-latitude dinosaurs. Second, the adaptations exhibited by these dinosaurs for living at high latitudes should somehow adjust our concept of the Arctic over geologic time frames stretching back vastly earlier than our cartoon notions of Ice Age cave men and woolly mammoths.

Alaska is built of enormous geologic blocks, some of which originated far south of their present location. By the late Cretaceous, however, most of these blocks of land had assumed positions at least as far north as we find them today. Thus, dinosaur fossils were not posthumously hijacked northward by plate tectonics to confound science; the animals actually lived at high latitudes during the Cretaceous.

As intensive quarrying progressed and additional discoveries extended known dinosaur Alaska ranges in both space and time, it became clear that these animals thrived in the Arctic, not just at the tail end of the Cretaceous but for tens of millions of years. A rich assemblage of various forms of dinosaurs indeed populated high latitudes. Dinosaurs in Alaska included large and small theropods (bipedal predatory types), a pachycephalosaur (dome-headed), an ankylosaur (armored), ceratopsian (horned) and hadrosaurian (duck-billed) dinosaurs. In addition to these dinosaur remains, remains of chondrichthyian (sharks) and osteichthyan (bony) fishes, a turtle, a bird, and multituberculate, marsupial, and placental mammals have also been found. Data from fossil plants, isotopes and several other means have shown that the climate of the high latitudes was somewhat milder during the Cretaceous than it is today. The mean annual temperature range for the Cretaceous North Slope is approximately the range observed today between Oregon and southern Alberta.

Happy homebodies or wayward wanderers?

To resolve the problem of the physiology of high-latitude dinosaurs, Nicholas Hotton in 1980 invoked a long-distance migration model in which these animals migrated thousands of kilometres on a journey tightly constrained by seasonality in forage, temperature, and light conditions. Subsequently, other workers used a modern analog, caribou, as the model for Arctic hadrosaur migrations.

Photo by A. R. Fiorillo

Pachyrhinosaur skull partially excavated in the quarry. Occipital condyle can be seen at upper right of photograph.

(Continued at right)

(Continued from page 3)

Range by D. Jones, A. Grantz, I. Tailleur, G. Gryc, and others who recognized the complexity of faulting and began to apply the newly-emerging model of plate tectonics to unraveling the history of the Arctic Slope and the thick wedges of sedimentary rocks that they were mapping above and below the surface. During the 1960s, oil company geologists working for Atlantic Richfield, B.P. and Shell, including Gar Pessel, Gil Mull, and Robert Liscomb began moving north from the Brooks Range zeroing in on what was to become the "Mother Lode" of petroleum discoveries in North America. In 1968, Prudhoe Bay State #1 Discovery well and the Sag River #1 well confirmed the "super giant" Prudhoe Bay oil field. Most of the oil and gas were trapped in Mesozoic rocks that spanned the "Age of Dinosaurs" and their fossil kin. By the end of the '70s, USGS field geologists had mapped and formally defined the great bulk of rock units that we now study and quarry for dinosaurs and related vertebrates.

In 1983, Liscomb's 1961 collection from the Colville River came to light. USGS paleontologists recognized the dinosaurian significance of the fossils, and in 1984 E. Brouwer, T. Ager and C. Powell of the USGS relocated and confirmed the presence of dinosaur bones at Liscomb's collecting site and beyond. Since 1985, most of the research on the dinosaurs of the Arctic Slope has been part of a cooperative program involving scientists from the University of California led by Dr. William Clemens, my associates and students at the University of Alaska, with the cooperation of the Bureau of Land Management and the North Slope Borough.

The 1980s were marked by a number of other interesting events. Gil Mull and Gar Pessel became members of the Alaska Division of Geological and Geophysical Surveys (ADDGS) and continued their work on the Mesozoic rocks of northern Alaska, where they refined and extended the mapping and interpretation of the environments contained in miles of rock record that was swept northward from the emerging Brooks Range and filled in basins resulting from the twisting and warping of the earth's crust as it accommodated the opening of the Arctic Ocean Basin and the collision of plates to the south. Gil Mull's work alerted me to the possibility of dinosaur trackways along the Colville River. A team that included Kevin and Lizzie May of the University of Alaska Museum, Anne Pasch of the University of Alaska Anchorage, and others, discovered extensive trackways in the summers of 1998 and '99. Dr. Tony Fiorillo of the Dallas Museum of Natural History and Dr. Louis Jacobs of Southern Methodist University have joined Alaska-based efforts since 1999. Gill Mull continues to be an active field geologist for ADDGS and a source of inspiration and knowledge concerning the regional geologic history of Alaska's dinosaur grounds.

Today, geology of the Arctic Slope and Coastal Plain continues to define, fuse, and even confuse, economic and political life in Alaska. The competing interests of Native Alaskans, conservation groups, oil companies, the Federal and State governments all combine in this natural crucible. It is hard to guess what alloy will emerge, but I predict one thing confidently: The underlying role of geosciences and the lives of hundreds of individuals who spend careers studying the earth history of this extraordinary part of the planet will continue to be underrecognized. ❑ ***Dr. Gangloff is Curator of Earth Sciences at the University of Alaska Museum in Fairbanks.***

(CONTINUED FROM LEFT)

Because of the attention previously placed on caribou as a migration analog, Roland Gangloff and I examined the body sizes of adults *versus* juveniles in three Arctic herds of caribou to establish a baseline datum for body size relationships at the onset of presumed migration in hadrosaurs. Our study focused qualitatively on the energetics of long distance travel rather than an extrapolation of mean travel distance as used by others advocating the caribou migration model.

The cell structure of the bones of the hadrosaurs from northern Alaska clearly shows developmental growth indicative of juveniles rather than some form of a dwarf population, and likely to be at least one year old. The bone element lengths when compared to adults of the same genus, *Edmontosaurus*, show that they were 27-37 percent adult size, and an estimated 11 percent adult mass. In contrast, juvenile caribou reach 80-85 percent adult lengths and 53-74 percent adult mass at the onset of migration. Therefore, on simple biomechanical grounds, the caribou model is inappropriate and our analysis suggests that hadrosaurs of the Arctic did not migrate great lengths.

Adaptations to the high latitudes

If their prey did not migrate, logic suggests that the predators need not have migrated, and that they adapted to year-round existence in the high-latitudes. The teeth of predatory dinosaurs are taxonomically useful. The predatory fauna of Alaska is similar to that found through much of western North America. The relative frequencies of the different theropods, however, differ markedly. For example, in rocks of similar ages in Montana and Alberta the faunas are dominated by *Saurornitholestes*, while the northern Alaska fauna is dominated by the remains of *Troödon*.

In Alaska the preserved potential prey items include hadrosaurs, ceratopsians and pachycephalosaurs, animals also preserved in Montanan and Albertan dinosaur faunas. Functionally then, these theropods depended upon similar food resources available to them in both areas. The basic jaw shape and estimated bite forces in Cretaceous small theropods were comparable, suggesting these animals were likely in direct competition for food resources and developed some means to partition food resources.

Dale Russell and Ron Seguin examined the skull of *Troödon* and they showed the increased relative brain size and eye orbit diameter of this animal compared to other small theropods. From this observation, they suggested that *Troödon* was a predator that was adapted to low levels of sunlight.

It seems reasonable then that the abundance of *Troödon* in the Alaskan fauna is a faunal adaptation to life in a high latitude environment and that environment experienced, like today, long periods of low angle light. During those times of the year with long days a high-latitude flora did exist for the North Slope of Alaska during the Late Cretaceous, a flora dominated by a species of the deciduous conifer *Parataxodium*. Therefore adaptations for low-light conditions would clearly be advantageous and presumably the forest vegetation continued the low light conditions during the times of the year of more intense light.

Is there a Cretaceous Arctic?

To someone observing ecosystems from ground-level, the Arctic tends to be defined by cold-limitations: the northernmost tree line, the geographic extent of highly adapted taxa such as the polar bear, the average extent of sea ice, etc. For others, the Arctic is defined by that latitudinal line on the planet referred to as the Arctic Circle, that line north of which the sun shines at midnight and fails to rise at noon for at least one day out of the year.

A region of great annual ranges in temperature as well as light intensity and duration of light, the Arctic can be characterized as a cold desert. It is a region of the Earth currently inhabited by few species, but great numbers of individuals. These species demonstrate a wide variety of adaptations to this extreme environment, the adaptations of the polar bear for life as a marine mammal as one dramatic example.

The occurrence of dinosaurs in this region has profound implications for how we perceive the Arctic in earlier geologic time. Climatic reconstructions for the North Slope suggest a milder climate during the Cretaceous than today. Certainly the concept of the modern Arctic that includes current biological and climatological phenomena is inapplicable to the Cretaceous high latitudes. Indeed, the estimated mean annual temperatures derived from various methods are within the temperature tolerances of many modern frogs, snakes, and other reptiles, so neither low nor extreme temperatures are operative parameters for discussing a deep past for the Arctic. One constant through time, however, has been the relationship of low-angle sunlight to high latitudes. Given that relationship, it appears that in the Cretaceous, the indigenous fauna adapted to life in an environment oscillating between seasons of constant low-angle sunlight and sunless twilight. Thus, the concept of the Arctic as a function of its "northness" and subsequent impact on biological productivity has a rich, deep geologic history. ❑ *Tony Fiorillo is curator of Earth Sciences at the Dallas Museum of Natural History*

Dr. George A. Llano Dies While Aboard Tour Ship

Dr. George A. Llano, biologist, lichenologist and program manager for biological and medical sciences in the U.S. National Science Foundation's Office of Polar Programs from 1960-77, died aboard the Antarctic tour ship *Akademic Ioffe* on Feb. 9, 2003. He was 93.

Llano was working as a staff member on *Ioffe*, which was one day into a 19-day voyage from Ushuaia, Argentina to the Falklands, South Georgia and Antarctic Peninsula. Llano had lectured and traveled extensively aboard polar tourist vessels for the past two decades. "He ended his life living his desire and not wishing it. Not many can have that," said his son, Dr. Charles D. Llano.

Llano's work on the U.S. national committee for the IGY led him to NSF's nascent polar program in 1960. He retired in 1977 as acting chief scientist and program manager of the NSF polar programs office. He promoted funding for work in the region near the South Pole, edited works including *Antarctic Terrestrial Biology* and several volumes of *Biology of the Antarctic Seas,* and mentored generations of researchers.

"What I did was to contribute to the academic pool by enriching it with polar workers with polar field experience," Llano told Peter Anderson in 1989 in an interview that is now part of the American Polar Society's oral history program archives (see www.lib.ohio-state.edu/arvweb/polar/oralhist/oralmain.htm).

Mount Llano (1,930 meters) in the Prince Olav Mountains near the southern fringe of the Ross Ice Shelf was named after him, as was a family of prehistoric whales, thanks to a whale researcher who was grateful for Llano's funding.

George Albert Llano was born in Havana and educated in the U.S. He became a U.S. citizen.

He was a zoology graduate of Cornell University and received a master's degree in museum science at Columbia University and a doctorate in botany from Washington University in St. Louis.

While pursuing his studies in the 1930s and 1940s, he held biology research positions, including the Agriculture Department's soil conservation service and the National Park Service.

Llano was a world authority on shark attacks. During World War II, he tested survival equipment and techniques while serving in the Army Air Forces. At one point, while in a raft off the Florida coast testing solar stills, he spent several unplanned days out in the ocean when a storm blew his raft out to sea and his superiors lost track of his position. Eventually he was spotted by a plane. Llano collected debriefings of airmen who ditched at sea into a book titled *Airmen Against the Sea: An Analysis of Sea Survival Experiences* (republished in 2002), and wrote another book on the subject, *Sharks: Attacks on Man*, in 1975.

While stationed at Eglin Air Force Base, Fla., he researched lichens in his spare time, work that led to his landmark publication on *Umbilicaria* in 1950. Llano was also credited with discovering *Cladonia perforata*, a perforated lichen with a coral-like shape that in 1993 became one of the first lichens placed on the federal endangered species list.

His awards include the Antarctic Medal and a Meritorious Award from the National Science Foundation. He was elected an American Fellow of the Arctic Institute of North America in 1958.

Llano moved to Florida in the late 1970s and at his death lived in Lakeland, Fla. His wife, Barbara Pray Llano, whom he married in 1946, died in 1989. Survivors include three children, Felise L. Llano of Burlington, Mass., and Dr. Charles D. Llano and Christopher F. Llano, both of Lakeland; one brother; and four grandchildren.

A memorial for Llano will be held at his old club, the Cosmos Club in Washington, D.C., on Sept. 25, 2003. More information can be obtained from CharlesDL@aol.com. ❑ *—by Jeff Rubin, with material from* **Washington Post** *obituary by Adam Bernstein, dated Feb. 15, 2003.*

Arctic Dinosaurs—Inauguration to Field Work

By Sonya Senkowsky

PHOTO BY A. R. FIORILLO

View looking north that takes in the Kikak-Tegoseak quarry near the top of the bluff, with Sonya Senkowsky at far left (in baseball cap). The Colville River dominates the flood plain at the foot of these bluffs.

Alaska's North Slope–Having volunteered to join dinosaur hunters for a two-week excavation on the tundra, I find myself high above the Colville River, crawling up the side of a steep, crumbling bluff. The tundra, it turns out, is nearly 500 feet uphill from the river. In places, dried mud crumbles beneath our touch. In others, it gives way to boot-sucking fresh muck. Shortly before 10 a.m., we reach the top of the bluff and are rewarded with a rapturous view.

Expedition leader Tony Fiorillo, 44, is exhilarated. "Welcome to the northernmost horned-dinosaur bone bed in the world," he announces. This is a remote location, difficult to reach even with modern conveniences, so excavations here are rare. For the past five years, Tony has been one of the few paleontologists from outside Alaska who has been probing its secrets.

"If I don't leave the North Slope for the rest of my career," he tells me, "I'll be content." Curator of Earth Sciences at the Dallas Museum of Natural History, Fiorillo has brought us here as part of a joint expedition with the University of Alaska Museum to extract the fossilized bones of a horned dinosaur first discovered here several years ago.

At minimum, we're here to take out a skull; at best, we could leave with a full skeleton — the most complete of its kind found in the Arctic. Before leaving Fairbanks, Fiorillo had toured us through an exhibit at the University Museum to show us what we were after. The *Pachyrhinosaurus* skull, extracted from near where we'll be digging, is about four feet long—the animals were larger than today's African rhino, and adult skulls can reach six feet—the back of its head encircled by a thick frill. Its most distinguishing feature: a nose terminating in a distinctive horn-like bump, known as a "boss."

It's been 70 million years since this animal was alive. If it returned, however, it would feel about as out of place on the tundra as I do. Although the Arctic Plate, the part of the earth's crust on which the North Slope site sits, was actually located a little farther north during the late Cretaceous than it is now, fossil evidence shows that the weather was less extreme, supporting evergreen forests with a flowering understory. The pachyrhinosaur wouldn't have recognized the Colville at all; the river did not exist.

Besides Tony and myself, there are four team members: Louis Jacobs and Kent Newman, from Southern Methodist University in Dallas, where Louis is a professor and director of SMU's Shuler Museum of Paleontology and Kent is chief preparator. The youngest members of the team are Jacob's graduate student, Pete Rose, and University of Alaska Fairbanks undergraduate Aaron Hawkins, both 23.

To reach this site, soldiers from Ft. Wainwright's helicopter Company B, 4th Battalion, 123rd Aviation—who were using the trip to augment their Arctic training—had loaded us onto heavy-lifting CH-47 "Chinook" helicopters for our journey above the Arctic Circle and across the Brooks Range to our camp, between 69 and 70 degrees North latitude. Despite the ease with which we reached the Kikak-Tegoseak site, we are now isolated, a day-long boat trip from the nearest village, Nuiqsut, and half a day from a second expedition camp. That camp, led by University of Alaska Museum curator Roland Gangloff—expedition leader and long-time caretaker and spokesperson for Alaska's unsung dinosaurs—is north of us at the famously fossil-rich Liscomb site.

The first day, Monday, we start the task we came here for—uncovering the skull that was left here, encased in plaster by a previous team. Then, armed with icepicks, chisels and brushes, we all work carefully to unearth other bones at the quarry site layer by layer. It works like this: Poke a series of holes a few millimeters in depth across the site in a rectangle, being careful not to jab too forcefully or dislodge potential fossils. Brush away the loose earth to see what is beneath. Repeat. Every once in a while, one of us finds something that just seems to fall out of the earth, and Tony shows interest. "Did you see where this came out?" This is going to be a race against time, with only two weeks available and, at a minimum, a several-hundred pound fossil skull to get out and transport to Fairbanks.

By Tuesday, I am learning what a bone doesn't look like. Fossilized bones are shiny and have a telltale grain. The warmth and direct sun that felt so good in camp feels unrelenting and somewhat cruel here atop the bluff, especially since the lack of a good breeze invites mosquitoes that increase in number as we dig.

Wednesday, Kent is hobbled by a knee injury after descending the slope. Tony asks him to stay in camp to recover, but is privately concerned; Kent is among the strongest and most experienced of the group.

> *"The famous Liscomb bed, downriver, was the coolest site on the Slope," Tony says. "This one is now."*

In the meantime, Aaron and Pete are proving to be workhorses, and Aaron makes an important find. By the end of Thursday, he has uncovered two occipital condyles, distinctive spherical bones that look like bocce balls. "That made me smile," said Tony. It means he can say with certainty now that there are at least three animals here. These ball joints, from the end of the horned dinosaur's spine, supported their weighty skulls. The sizes of the condyles can be related to the animals' sizes and ages and their grouping adds to a picture of how the pachyrhinosaurs lived and died. Most importantly, each one of them we find means another skull beneath our feet.

We quicken our pace of work, and begin to wrap the first skull in more plaster-soaked strips

of burlap, forming what paleontologists call a "jacket" to protect the bone. By Saturday, we are practically on top of one another, each person's careful excavation, threatening to bury the work of another. Soon the professionals begin to question the methodical approach. Some of the bone is so fragile that it deteriorates at the touch of a brush. The rest is embedded in hard rock, and we've already discovered many pieces only after they've been split in two with pickaxes.

"I would describe this as a bone pavement," says Tony. "You could walk across this bone bed and not touch the ground." In bone density, he says, the find already rivals the famous Liscomb bed downriver. "That was the coolest site on the Slope," he says. "This one is now."

Tony changes the plan: We will stop our detail work. Instead of returning with the skull found several years ago, we're going to make a new jacket, encompassing as large a sample of the logjam as we can manage. We prepare for an early morning.

As the finds continue, Tony's concern grows. We lose a day of work because of a night raid by a grizzly bear that deprives us all of sleep before we succeed in driving the bear away in the early morning. Added to that, our nice weather is replaced with gray periods of numbing cold rain; our climbing trail to the site becomes a gooey mudslide.

"This isn't going to work," Tony confides. The new jacket we've created, at more than 1,000 pounds, is bigger even than the first one Louis had fretted over. Without extra reinforcement, it could crumble under its own weight. But we're nearly out of plaster.

Aaron uses our satellite phone to arrange for family members to send more; it's possible the Army can bring it on the 26th, a Friday. The choppers don't arrive. But Tony remains calm.

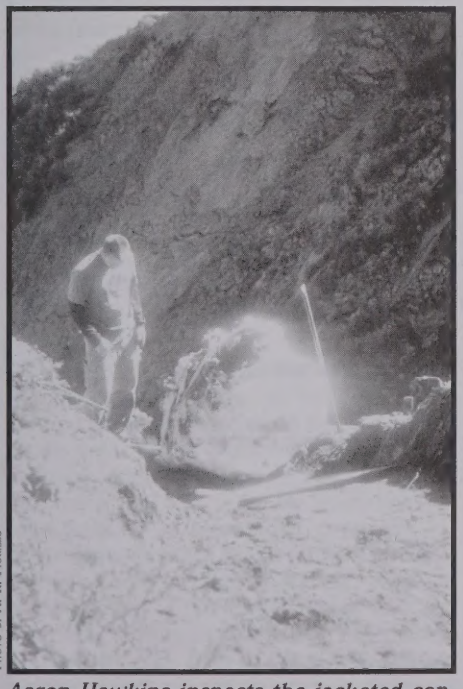


PHOTO BY A. R. FIORILLO

Aaron Hawkins inspects the jacketed conglomerate of three pachyrhinosaur skulls awaiting lifting by helicopter.

PHOTO BY A. R. FIORILLO

Chinook helicopter slinging the jacketed fossils across the Colville River to a bar where they can be winched into the cargo hold for the trip to Fairbanks.

"All the cards have been played now," he says. "All we can do is do our best."

In the remaining two days, part of the team digs around the jacket and tunnels beneath it to make room for reinforcing straps, while others take turns hacking out a "road" to reduce the steep rise to the tundra. Instead of plaster, we pack in clay found onsite to fill in gaps. Just maybe we can still bring this monster back.

Spirits rise. And when the Chinooks arrive Monday, the extraction begins. The helicopter is positioned at the edge of the tundra, a steel cable connecting it by winch to the package below. For a few moments, with the help of the paleontology team pushing from below, the jacket begins to move. But it gets only a few feet up the hill when the cable snaps. A metal buckle from a reinforcing strap sizzles through the air, just missing Aaron and Peter. Fast action and steel bars keep the jacket from rolling off the bluff, but it ends up perched precariously mid-slope. After conferring, the soldiers break the bad news: They have no other cables or cargo nets. We'll have to go home without the jacket.

We board the Chinook. It's too noisy to talk, but Tony and I pass notes. "All trip I was waiting for the Arctic to kick my ass," he writes. "The Arctic finally kicked by forcing us to leave the jacket." I want to ask "Now what?" but it seems too sensitive a question. Even if we can return, there are no guarantees how long that jacket can stay poised on the slope. Back in Fairbanks, we share beers and spend a night planning our departures. The next day there's a call for Tony: The Army is eager to try again. We're going back.

At an ungodly early hour, we assemble for our return north by helicopter. This time, the team is pumped—especially Tony: "God," he says, "I love to come to bat at the bottom of the ninth with the game on the line." But recent events have sobered him. The strap whipping past Aaron and Pete could have been deadly. This time, he announces, no one is to go anywhere near the cable or jacket while it's being lifted. We return to the tundra with more plaster, and the guys glop the stuff on the frail jacket.

> *"Failure was not an option, and we didn't fail."*

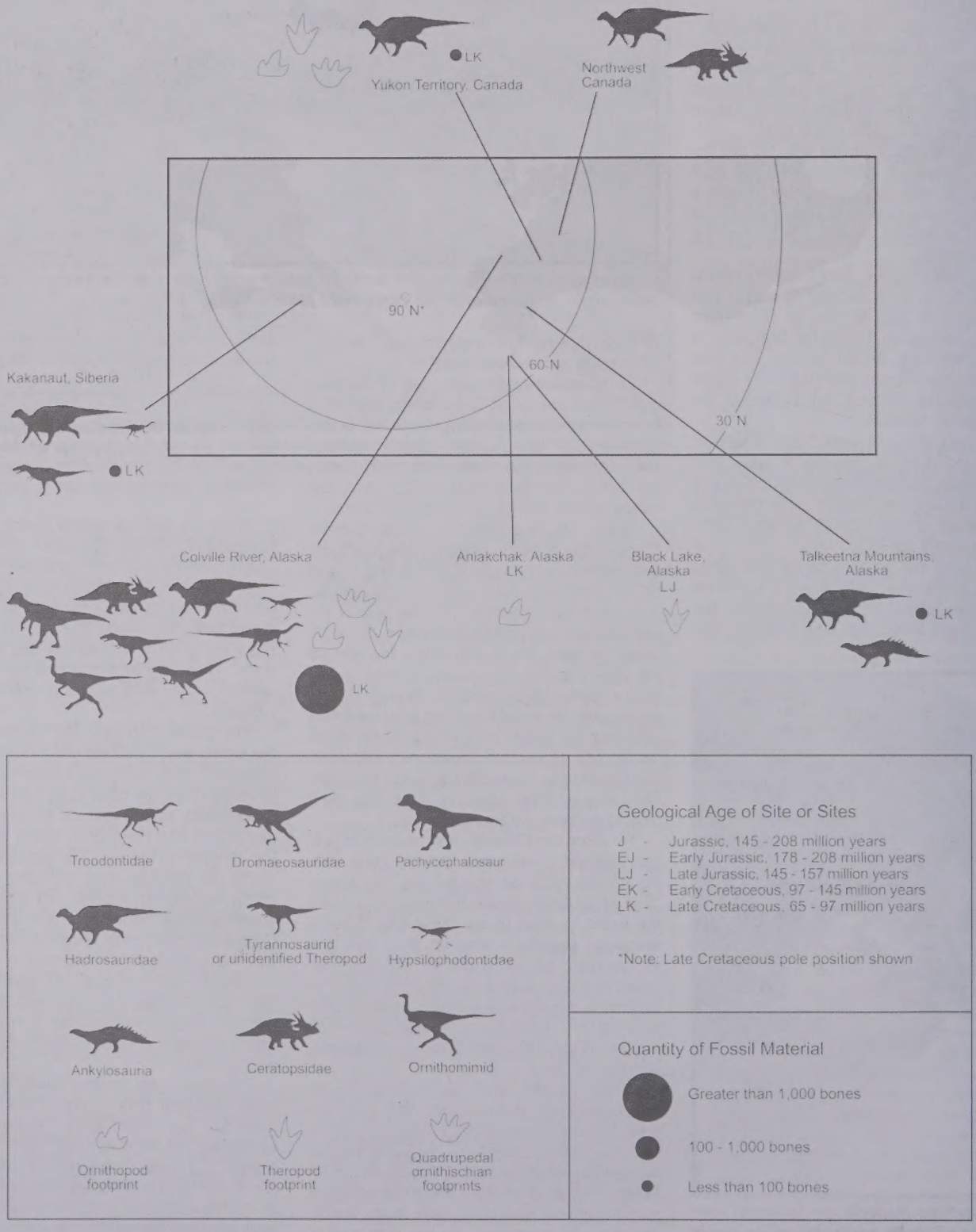
While we wait for plaster to dry, the Army team considers the situation. The jacket is clearly heavier than we'd originally estimated —more like 2,200 pounds than 1,500, says Chief Warrant Officer 2 Brandon Stites; that's why it broke the winch. This time, they'll use a cargo net to lift it without working against the slope. Then they'll fly it across the river to a sandbar where we'll push and pull it into the Chinook.

The planned lift goes like clockwork. First the winch gently rolls the jacket back onto the cargo net. Then, the Chinook gets into position, hovering above the quarry, the blades of its rotors blowing hurricane-force winds on the soldier below who grapples to attach a line from the chopper to the net. The package lifts. We watch the chopper cross the river and set it gently on the bar. Cheers and high-fives are drowned by the helicopter's valley-filling racket, but our work isn't done. After we cross the river to the bar, we combine the power of winch and muscles to push and pull the massive object aboard the chopper. Whoops and handshakes mark the victory, but only for a moment. And then it's time to go—this time with exactly what we came for.

That night, Kent declares the expedition "the most amazing fossil extrication in North America." The others agree. "Failure was not an option, and we didn't fail," says Tony. "We soared." ❑ *Sonya Senkowsky is a free-lance science writer based in Anchorage. She may be reached at* <sonya@alaskawriter.com> *A version of this story appeared previously in the* Fairbanks Daily News-Miner's Heartland Magazine.

Dinosaurs of the North

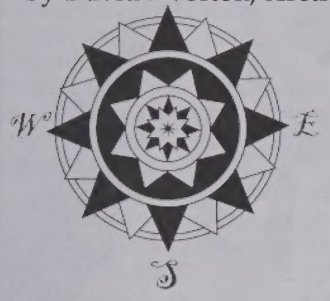
Overview of known dinosaur localities in the northern high latitudes, showing that the northern Alaska (Colville) sites are the most diverse and richest in total numbers of specimens by a large margin. Graphic design by Dixon J. Jones, courtesy of Roland Gangloff, University of Alaska Fairbanks.



Environmental Ignorance: What It Costs

Due North

by David Norton, Arctic Editor



Alaska's Congressional delegation must have regretted U.S. Interior Secretary Gale Norton's speaking in favor of their and the Bush Administration's campaign to open ANWR's coastal plain to petroleum drilling. Secretary Norton (not a known relative to *PT*'s Arctic editor) tried to distinguish ANWR from "wilderness" by portraying the potential drilling lands as nothing but a cold, flat, white landscape each spring. Whether she lost her train of logic in midthought, or took someone else's rhetoric out of context, supporters and opponents of ANWR drilling alike were left wondering at the Secretary's *non-sequitur*. "Huh?" editorialized our local newspaper. Her image of desolation clashed with those of caribou herds and wildfowl on that same tundra, which both sides of this national debate hold dear despite their contrasting tactics with Congress. Small wonder that environmentalists made sport of the Secretary's weird portrait of Arctic seasonality.

As Prof. Carl Benson, glaciologist and Arctic Pundit Laureate, often observes, "Ignorance of the Arctic is an infinite resource."

Secretary Norton did not know when to stop. She blundered ahead to say that for over 50 days each winter, the northern part of ANWR is totally dark. Whoa! Think for a minute. Total darkness outdoors is hard to find. As a nine-year resident of Barrow, let me assure you that total darkness 24 hours a day never hits 71° North Latitude, over a degree farther north than ANWR's northern edge. Moonlight, stars and *aurora borealis* brighten winter skies, snow is a good reflector, and solar light never fully recedes at these latitudes. Even on Winter Solstice day, Barrow's southern sky is luminous from the sun's trajectory below the horizon, the indirect glow of which lights the south for three to four hours. On a trip to Barrow in mid-January 2003, I was again dazzled by how bright the five to six hours of twilit pink clouds were, still ten days before the sun was first due to peek above the horizon.

As Prof. Carl Benson, glaciologist and Arctic Pundit Laureate, often observes, "Ignorance of the Arctic is an infinite resource." Whether or not Secretary Norton's remarks illustrate Benson's axiom, their timing was devastating to a Senate vote on amendments to the Energy bill—at least in the eyes of proponents of ANWR drilling. Senator Ted Stevens lashed out at key Republicans for deserting the party's and administration's line and defeating a pro-drilling amendment, warning them he considered their votes to be against him personally and that he would "not forget." ANWR drilling, according to Congress-watchers, will come up for votes until Stevens' view wins.

Global and culturally homogenized TV nibbles away at the uniqueness of our northern communities.

Ignorance of the Arctic is not limited to Bush Administration cabinet members. Secretary Norton has plenty of company. Nor is the Arctic necessarily the butt of more studied U.S. ignorance than other regions or environments. As an example of "company," I couldn't identify more than two of the nations that border Iraq until recently.

Inevitably, somebody pays for environmental ignorance. It used to amuse me to watch folks in Barrow plug in their car's headbolt heater based on the windchill equivalents reported in broadcast weather reports, while making no adjustment in the warmth with which they dressed themselves. In this case, they paid a little penalty for not knowing that windchill equivalents were designed to tell them only how fast exposed human flesh would freeze. Folks who think engine blocks are like human skin pay for a few unnecessary kilowatt-hours of electricity—perhaps $100 per year.

Last year I watched a significant hemorrhage of public money, owing to ignorance of the environment. In early March 2002, the hills surrounding Fairbanks had experienced a snow drought that had furnished us only 30 percent of our normal snow accumulation by late winter. While skiers carefully husbanded the resources of crystalline H_2O, snow plowing contractors fretted whether their winter cash cow would produce any more revenue in the 30 days before breakup normally hits stride. Contractors with thin wallets persuaded dozens of Fairbanks' outlying 100-plus neighborhood service districts to pretend breakup would be a month early in 2002. This scam meant paying contractors in advance to scrape residential roads down to bare gravel, starting on 12 March 2002. The result of this scorched earth attack was ugly. Cars driving faster on exposed gravel roiled dust clouds across expanses of darkening snow. Access points and crossings of off-road trails were amputated a month earlier than skiers, dogmushers, snowmachiners, and skijorers had planned. Scores of Fairbanksans accustomed to recreational trail access from their back yards either gave up offroad travel early or *drove* cars and trucks to trailheads beyond this blight. Mother Nature soon retaliated for ignorance of her climatology. Right after Spring Equinox, a series of Bering Sea cyclones dosed Fairbanks with snow. The parade of storms continued for a month, making April 2002 the snowiest in 98 years of record. Snowplows repeatedly re-liberated neighborhoods previously cleared. Skiers joyfully plied trails into early May for the first time Fairbanksans could remember. Service districts tallied debts to plowing contractors. I'd put the bill at about $100,000 for jumping the gun in 2002.

Kids turn their backs on the natural systems that nurtured generations of their ancestors.

I could run on and on, up a scale of more and more costly examples of being environmentally uninformed, but we can jump ahead to the most costly manifestations of environmental ignorance, which are beyond priceless. Consider the way that rich linguistic recipes and traditions for living successfully in Arctic environments are being deserted. Global and culturally homogenized TV nibbles away at the uniqueness of our northern communities. Youngsters learn less and less about their local environments. Basketball, dress fads, and Hollywood farce displace the next generation's concern for their surroundings in rural Alaska. Kids turn their backs on the natural systems that nurtured generations of their ancestors. It took me a long time to grasp why Iñupiaq language falls into disuse amongst my dear Iñupiat friends, their children and grandchildren. I think it's because Iñupiaq and other northern languages are outdoor ways of knowing. These linguistic natural histories are being dissolved by the indoor culture of an electronic age, which cocoons itself off from real environmental experience. My alarm over this slippery slope toward environmental ignorance isn't unique...or is it? ❑

Inevitably, somebody pays for environmental ignorance.

Reflections on a Fallen Alaska Star

By Dan O'Neill

It was like looking up at the Big Dipper and finding one of its stars missing. With the death of David M. Hopkins, Alaska lost one of its great contributing pioneers of regional science on 2 November 2001.

Known as the foremost authority on the Bering Land Bridge, Hopkins' career was that of a scientific sleuth. He earned his place in the pantheon of interdisciplinary scientists by leading a number of his colleagues in accumulating evidence for emergence of dry land connections between Alaska and Asia during the several glacial maxima since the beginning of the Pleistocene, or Ice age. Hopkins' 1967 book on the Bering Land Bridge marked the second breathtaking contribution by Alaskan geology in one decade to the growth of geological understanding as a whole. (The first was the role of the Great Alaska Earthquake of Good Friday 1964 in convincing its last opponents of the usefulness of plate tectonic theory.)

Known as the foremost authority on the Bering Land Bridge, Hopkins' career was that of a scientific sleuth.

Dave Hopkins got his early scientific training from his mother, who took him walking in the woods around their village in southern New Hampshire. She showed him where the trilliums grew, the Jack-in-the-pulpits, and the lady slippers. Soon he was collecting snakes and turtles and the eggs of toads and salamanders and frogs. By the time he was in high school, Dave probably knew more about the lower vertebrate fauna of southern New Hampshire than anyone alive. Besides natural history, his mother ignited Dave's interest in oral history, although that name for it was not invented until recently. She took him on visits to the town's oldest people, gathering the history of 150 years of settlement and learning the whereabouts of long-overgrown roads that had connected former farmsteads. And he went with her, too, on ground-truthing walks to find parallel rows of tumbled-down stone walls that delineated old roads, now grown up in woodland; the lilacs and crabapples that once grew in farmyards; and the rectangular depressions that marked the cellar holes of houses.

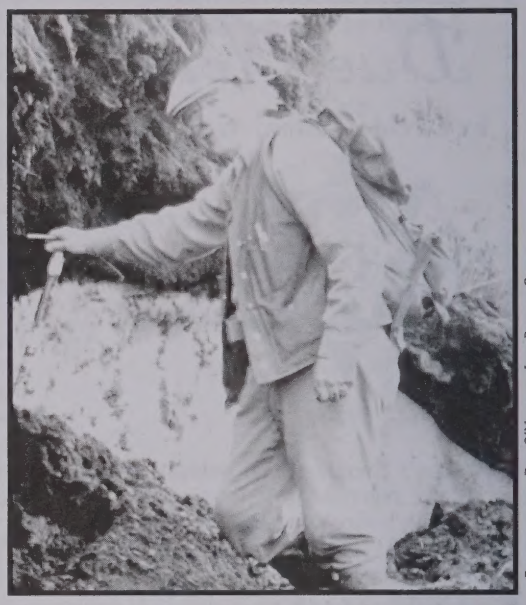
Enriched by this early background, and seasoned with a Harvard PhD to cap his formal education, it's hardly surprising that Dave Hopkins spent his career searching for clues of an ancient landscape. Just as his New Hampshire village was laced with the vestiges of extinct byways and pocked with nearly obscured evidence of habitation, the region of Bering Strait became his bigger world of discovery of obscure clues. For over fifty years, Hopkins sleuthed natural history, oral history, archeology and geology, to piece together the story of what may be the greatest ancient thoroughfare in history: the Bering Land Bridge.

"The Bering Land Bridge" made the case for the existence of a dry-land connection between North America and Asia, most recently during the last glacial maximum that began releasing its hold on North America about 18,000 years ago. The history of sea levels and the record of animal migrations showed that this centuries-old conjecture must be true. At times the Bridge was a thousand miles wide, extending from Bristol Bay to the Arctic Ocean. Many scholars believe man walked into the New World across this land mass, called Beringia, during the tail end of the last Ice Age. Hopkins' 1982 book, "The Paleoecology of Beringia," organized a variety of studies aiming to reconstruct the ancient landscape, vegetation, animal populations and climate of this erstwhile subcontinent. Both books are models of interdisciplinary studies. Researchers with interests in the Quaternary, refer to these two Hopkins books as "The Old and The New Testaments."

Over the course of 43 years as a research geologist with the Alaska Section of the U.S. Geological Survey based in Menlo Park, California, Hopkins spent most field seasons camped in remote corners of Alaska, from the Aleutian Islands, to Glacier Bay, to Interior mining camps, to Seward Peninsula. Besides his work on the land bridge, he did geologic mapping, studied permafrost phenomena, thaw lakes, placer deposits, and even Arctic marine geology. In the early 1970s, Dave pioneered the establishment of collegial relations with his counterpart scientists on the other side of Bering Strait in the Soviet Union.

By the time he was in high school, Dave probably knew more about the lower vertebrate fauna of southern New Hampshire than anyone alive.

After retiring from the USGS, Hopkins moved to the University of Alaska Fairbanks in 1985, where he was Distinguished Professor of Quarternary Science and Director of the Alaska Quarternary Center. He inspired many young scientists to do research in the region, mentored a score of graduate students, and will be remembered for assisting the professional development of women scientists, several of whom have become established Beringia scholars.



Photo, courtesy Dan O'Neill and Julie Brigham-Grette.

Dave Hopkins examining an ice lens in the early 1980s.

It was like looking up at the Big Dipper and finding one of its stars missing.

Besides a busy professional life, Dave and his wife, Rachel, were involved in community affairs as volunteers and as generous contributors to many local organizations and campaigns. While Dave was in the field for months at a time, Rachel maintained not just a home for their kids, but a group home for foster children.

Dave Hopkins' career is a model for those who work in scholarly occupations: his inextinguishable curiosity, his interest in and mastery of an astonishing array of subjects, his subordination of ego to the advancement of knowledge, his sense of public service, his mentoring of students and protégés. People who approach Dave Hopkins' stature not only add importantly to our understanding of the world, they teach us a lot about how to live. ❑

Editor's Note: *This text was adapted from an obituary that appeared in the* Fairbanks Daily News-Miner *shortly after Dr. Dave Hopkins' death. Dan O'Neill, prize-winning author of* The Firecracker Boys, *is presently looking for a publisher for his book on Dave Hopkins' central role in solving many of the mysteries of the Bering Land Bridge.*

Polar Extremes: The World Of Lincoln Ellsworth

By Beekman H. Pool. Fairbanks, AK: University of Alaska Press, 2002. ISBN 1-889963-44-5 (Softbound) 312 p., maps, b&w illustrations, index, references, U.S. $45.00 (hardbound); U.S. $24.95 (softbound).

A detractor might argue that Lincoln Ellsworth "purchased" his meteoric career in polar exploration. It is true that his father's and his own fortunes made it unnecessary for this American to worry about financial problems that dogged most of Ellsworth's contemporaries, all chronically short of financing for polar expeditions in the 1920s and '30s. It is also true that James and Lincoln Ellsworth subsidized the 1925 attempt designed and led by Roald Amundsen to reach the North Pole in two Dornier flying boats. Ellsworths, father and son, donated $95,000 of the expedition's total cost of $130,000.

Amundsen made Ellsworth full partner in his 1925 expedition, rather than treating him as a rich idler. As Beekman Pool shows, Lincoln Ellsworth repaid Amundsen's confidence by acting quickly to save the lives of his pilot and his navigator-engineer when they broke through thin ice after Amundsen's airplane was forced down by engine failure at 87°44'N, just 135 nautical miles (250 km) short of the Pole. Had those two perished, the remaining four men probably would not have had the strength to carve a runway and to manhandle the remaining airplane to get it airborne through three weeks of ordeals and setbacks. When all six men unexpectedly returned to Svalbard in late June, a joyous Norwegian national celebration broke out. Norway's government awarded Ellsworth a medal acknowledging his heroic intervention.

That was heady honor indeed for the American who had been so continuously frustrated in his hopes for polar exploration and glory that he was no longer young—he had reached his mid-40s—by the time of his inaugural polar adventure. As if to make up for lost time, Ellsworth was back the following year, again as a full partner, in the Amundsen-Ellsworth-Nobile transit of the Arctic Ocean via the North Pole in the Italian-built airship, *Norge*. This thoroughly successful airship flight, ironically, caused about as much agony as any one of the failed attempts to reach the North Pole—before or since. The *Norge* expedition was upstaged by the success of Richard Byrd and his pilot, Floyd Bennett just days before the *Norge* departed King's Bay. After *Norge*'s flight to Teller, festering personality and stylistic differences between Amundsen and Nobile boiled over and infected other participants and organizations. Ellsworth tried gamely, if unsuccessfully, to mediate and pacify the antagonists.

In 1928, of course, Nobile, thirsting for undiluted recognition, set out in his own airship, the *Italia*, to reach and to "land" at the Pole. Although the Italian expedition reached the Pole, bad weather forced the airship to retreat without landing, and on the return flight to Svalbard, the dirigible crashed. Amundsen, burying his animosity toward Nobile, died with his pilot *en route* to Svalbard to take part in the eventually successful search for survivors. It long perplexed me that Lincoln Ellsworth did not take part in searches for Nobile and other survivors, but Beekman Pool shows that he was recuperating from a debilitating sinus condition and surgery to correct it. He was proud of his carefully nurtured physical prowess, and reticent about admitting to any weakness that might excuse him from future polar adventures, as he approached the age of 50.

The year 1930 proved pivotal. On the lookout for new polar adventures, Lincoln Ellsworth hitched his hopes to Sir Hubert Wilkins, and the under-ice exploits of the *Nautilus*, a hapless WWI submarine that Wilkins prised from the U.S. Navy. He also took an epic canoe trip across Labrador with the young college student who would publish this biography 72 years after their trip together.

After 1930, Ellsworth's career shifted to Antarctica. Seasoned by years of frustrations and delays in his aspirations, he waited for weather and outlasted countless setbacks. Assisted by Wilkins, and encouraged by Richard Byrd, he finally prevailed in late 1935 to fly with his pilot, Hollick-Kenyon, in the *Polar Star* from Dundee Island on the Weddell Sea to Little America on the Ross Sea despite a malfunctioning radio transmitter and wildly erratic sextant readings. There, the two awaited pickup for a month in relative comfort, although Ellsworth was suffering from an infected foot, and gradually weakened until the pair was picked up by an Australian patrol vessel in January 1936. With some shorter forays that stirred up trouble by asserting U.S. territorial claims to sections of Antarctica, Ellsworth's active exploration career ended by 1938-39, and the outbreak of WWII.

This book is an inspiring work of scholarly research and writing. Its objective review of interactions among a number of the polar heroes of the 1920s and '30s does much to fill gaps and clarify points that had remained unclear. ❑ ***Review by Dave Norton, Arctic Editor***

"Jenny's Class" P.S. 234, NYC Public School

For most of the 2002-2003 school year, the fourth-grade students of teacher Jennifer Dickerman have studied the Arctic. Jenny also weaves Arctic studies into writing skills (students write about the Arctic, its people,wildlife, geography) and art (students create images of Arctic scenery, animals, and the Innuit people).

An unidentified *Polar Times* editor has a grandchild in Jenny's class and so was privy to several poems written by these nine-year-olds. Following are a few examples, drawn from their collection entitled "An Arctic Past: Poems About Life in the Arctic."

The Someday City
by Julia Skrak

Someday the
Arctic will be
all city, but
it will not
be my home
The smoke will
be as black
as night. It
will never be
the same.
All the animals
will fall. No
more blossoms,
how sad. And
nothing good
will come out
of it.
How sad.

Ice Duck
By Chelsea Scott

My father
carved me a
toy duck out of ice.
It is really frosty.
It's so shiny it
doesn't have a bit
of dirt on it.
It shines like the
sun above the ocean's surface.
It's like crystal from a waterfall.

The tundra winter
by Katherine Capuder

On the winter tundra
the beautiful white snow
falls everywhere.
The lichen dot the landscape
here and there.
The land is lighted with
the stars,
the moon,
and the flickering northern
lights.
On these beautiful nights
I wonder why, why, why
can it not be winter
all the time?

Winter
by Reuben Sinder

Sheets and sheets of
snow piled high
ice waters,
fozen lichen
in the snow.
White-out,
stay inside
After all,it is
the season of
no sun.

Alaskan Lands
by Annie Roth

The ice covered lands
sheeted in snow
on an arctic night.
I hope the sun would rise
up in the sky
like an igloo
piled up high.
I hope the frozen desert
and the cold sea
would melt away
forever.

The Igloo
by Michael O'Connor

Igloo, igloo
Dull and white.
Igloo, igloo, cold at night.
Windows of clear ice so we can
see,
Blocks stacked slightly up like
A tornado stacked them. We melt
The igloo just a little bit to seal up
all
The cracks. We call our igloos
igavigak
It's amazing how something can
be so nice
When it's simply made of ice. ❑

Camp Century Revisited

The floor and end wall panels of this plastic building known as the CRREL Lab were removed in 1966 to allow the removal of drilling equipment from the rear of Trench 12. The wall-roof panels later collapsed under excessive snow loading.

Editors Note re Camp Century: In the "20-40-60 Years Ago" segment of our last issue we included a couple of paragraphs about Camp Century, the under-ice facility built in Greenland in the 1960s, and the question was asked if any APS members had knowledge of the fate of this in-the-ice complex. Was it still there? Had glacial movement and stressing destroyed it? Was it crushed beneath 40 years of ice and snow build-up? Here are some of the comments and facts we received:

Excerpts from letter by Capt. Donald Taub, USCG (Ret.)

I have some bits of information on Camp Century. I was there when it first began in 1959 and 1960, and I visited its base camp at the site called Camp Tuto again in 1994.

Camp Tuto was the base camp for construction of Camp Century, which was sited some 100 miles out on the ice cap. Camp Tuto was located on the solid ground just on the edge of the ice. It was about 10 to 15 miles from Thule Air Force Base at the end of a long dirt road. An earthen ramp was built to haul materials from ground level up on to the ice cap. From there, supplies and materials for Camp Century were hauled by sled to the work site. In 1994 when I revisited Camp Tuto, the ramp led skyward to nothing since the ice cap had receded or shrunk by some 50 to 75 feet, and this reduction was consistent as far as the eye could see.

One minor tale is that I provided a USCG Loran set to one of the Army's "swings," as these huge caterpillar tractor-drawn sleds were called. This was a small attempt to aid their navigation along the 100-plus-mile route from Camp Tuto to Camp Century. It did not work!

In his letter, Capt. Taub went on to describe the close relations he developed with the Eskimos who were often in close proximity to or visiting the Loran C station he commanded in the late 1950s:

I was a Lieutenant (JG) and commanding officer of the small U.S. Coast Guard Loran station, named Cape Atholl, that was located between Cape Atholl and Cape York, south of Thule Air Force Base. It was a 19-man operation, and we were located in vicinity of a 315-person Eskimo tribe. We were the "good guys" inasmuch as Thule Air Base was off-limits to the Eskimos and, indeed, a no-contact rule was in force that actively prevented any relations between Thule personnel and the local Eskimos. But these constraints did not apply to our station and, consequently, we were the good neighbors—a social center. Our shops were available for minor repairs, and we provided movies, meals and lodgings for Eskimo travellers.

The Thule AFB rules were intended to protect the Eskimos and their culture from what might be debilitating influences of prolonged contact with Americans. A good intention, perhaps, but in time it made for very bad relations with the native peoples. Compounding the problem of no relations was the fact that the Eskimos were evicted from their main village of Dundas and prohibited from hunting in one of the two fjords that were traditional sources of food. Ironically, these people had a long and rewarding relationship with Americans since their fathers and grandfathers had participated in U.S. Arctic explorations as far back as 1853. They served in seven of Robert E. Peary's expeditions and enabled him to discover the North Pole in 1909. Peary is recognized for having saved the then-tiny tribe from their open slide to extinction by paying for their services with vital materials of all sorts; tools, wood, hunting rifles, and whale boats from his ships. It is also known that Peary's party introduced some new genes that helped their tribe rebound in population. At least four sons were born to Eskimo women, three of whom I came to know.

Captain Taub also referred to a short article in the Fall-Winter edition of* Polar Times *that addressed a recent decision to return the Dundas village part of Thule AFB to local control. He describes the area, the relocation and the prospects for returning the village site to the former inhabitants as follows:

Dundas was a village that included the civilian Danish administration (church, trading post, school, clinic, weather station, etc.). Danish housing was quasi-modern wooden buildings, and the adjoining Eskimo village was made up of sod huts. It was situated on a relatively small and narrow peninsula with Thule's landmark mountain at its end. It separated the base on its south side on North Star Bay, from Wolstenholme Fjord on its north side, which had been a principle hunting area. This had been the Eskimos' main village.

A U.S. Army NIKE-Hercules missile battery (one of four around the air base) was also located here.

In October 1953, the Eskimos were relocated from Dundas-Thule, most of them to a newly built new Danish settlement approximately 75 air miles to the north on the shore of the next one of two large fjords, that is, Whale Sound to Kawak (today spelled Qaanaaq). A few Eskimos chose to relocate to three other smaller villages, also to the north. The second largest was on Herbert Island in Whale Sound. Eskimos who had permanent sod-hut homes at Dundas-Thule were given small wooden-box-like prefab houses at these new locations as compensation. They were equivalent in size to their former homes—and due to a goof-up were uninsulated! Their relocation took place in late Spring 1953 while the sea ice enabled them to move by dogsled. But their new prefab houses were not erected until in October at the onset of winter. These (with a couple of exceptions) were one-room shacks, with two windows, a small door, a coal stove for heat and cooking. Size about 9 by 11 feet, with a flat, sloped roof that also formed the ceiling inside, about six feet high. Their windows faced the sea. The original design called for them to be banked with

Rear of CRREL Lab

turf on their exterior, for insulation, similar to their sod-hut houses. This was not done. Hence, they were very cold inside.

The Ballistic Missile Early Warning Site, or BMEWS, like Camp Century, was also built in 1959-60. It was located overlooking one of the two fjords frequented by Eskimo hunters. There was said to be a fear that the powerful electronic emissions of the BMEWS facility would be harmful to any persons (Eskimo hunters) in front of it. This reinforced the notion of keeping the Eskimos out of the area.

Also, the Eskimos were kept out of Thule AFB's dump. Materials of great value to them were destroyed there..." to protect their culture."

Thule AFB was near the middle of the Eskimos' coastal turf. Their No. 1 (in size) new village at Kavak was to the north, and their No. 2 village, Savqsavik, was to the south. Thule Air Force Base's "defense zone" created a sizeable gap in the middle. Most of the Eskimos lived off of the sea life mammals, as well as fox trapping...and lesser, the nearly extinct caribou on land. Needless to say, a lot of bad feelings developed *vis-à-vis* the Air Force. The well-intentioned no-contact rules were to protect them from us. But that became one more insult to them.

As to the return of Dundas village for use by the Eskimos...that, to me, is most unlikely as the remaining houses, etc., are too large (they were built for the Danes), are in bad physical condition and are lacking in infrastructure (electric power station was destroyed; no water, etc.). On the other hand, the fjord area there was a major hunting area. Also, jobs are now available at Thule Air Base. Perhaps tourism may develop there in the future, via the airfield. Some very few Danish tourists are allowed to visit. As of 1994, there was a five-bedroom/10-bed "hotel" at Qaavaaq, which is accessible by civilian helicopter service. (I flew there in 1994 in a little four-seat Cessna that belonged to the Aero Club at Thule, landing on the little dirt road between the village and its cemetery.) Admiral R.E. Peary's Eskimo son, Kale (Kaali) Peary, was my host family at Qaavaaq, from our friendship in 1959-60. He has since died, in about 1998.

The "Save the Seals—Save the Whales" era, and outsiders, had wreaked havoc on this once very proud Polar Eskimo tribe, as well as the bans on furs (fox, etc.). These basically destroyed their marginal economy. They are still largely dependent upon hunting for their food. Outside clothing bought in the store has greatly reduced the use of fur clothing. One result is that seal skins are now largely garbage. And ivory tusks of walrus and narwhales are similarly nearly valueless; but they are still hunted for food. A "seed herd" of reindeer caribou was introduced via USCG's icebreaker *Westwind* in May 1967 and have multipled such that caribou are now hunted again...these new species are hunted together with the original local species that had nearly become extinct.

Don Taub,Captain, USCG (Ret.)

Dear Editor:

This is in response to your query in the last *Polar Times* for information on the fate of Camp Century. I worked there several different times during the 1960s and was last there during the summer of 1967, working with Austin Kovacs on the compressive strength of snow samples located from the inclined drift (see CRREL Research Report 276). As I recall it, the Army last carried out a surface operation there in 1966, although no one lived in the under-ice camp. In 1967, it was possible to walk around the underground camp, although some of the passageways were clearly closing. Deformation was most pronounced in the vicinity of the old nuclear reactor site and the water well, which were heat sources. Access to the camp was through a passageway from the old railroad trench. Even then the passage was quite narrow. Kovacs revisited Century in 1969 and took a number of photographs that clearly documented the deformation. This information can be found in CRREL Special Report SR 150 (1970) by Kovacs, entitled "Camp Century Revisited: A pictorial view—June 1969, 51 pp." That may have been the last time anyone visited Century.

Century is, of course, still there, but at present it would be very difficult to locate as ice deformation has undoubtedly essentially closed all the tunnels. We used to locate it by finding the met tower, which was very high. If the tower is still standing, it would still extend well above the current snow surface. However, even in 1967, there was clearly increasing loading on its guy wires as the result of the rising snow surface.I would be amazed if the tower is still standing.

Regards,
Willy Weeks ❑

Roof sags most where the inclined drift and railroad trench intersect.

Figure 1. Location of Camp Century, Greenland.

Rear of Jamesway in railroad trench.

Barrow Senior Awarded Honorary Doctorate

by Dave Norton

"For nearly sixty years, Kenneth Toovak, Sr. has combined keen observations of the natural and physical world around him with..." begins the Program entry for the 2003 University of Alaska Fairbanks Commencement. On 11th May 2003, Kenneth, "Utuayuk" or "Kenny" formally became "Dr. Toovak." It was a grand day for him, for his extended family, Iñupiat communities of Alaska's North Slope, and for his many admirers in the scientific community, some of whose arctic careers reach back almost to the beginning of Dr. Toovak's own career.

The initial sentence on the UAF Commencement Program was completed in many different ways during the weekend of celebrating degree recipients, faculty *emeriti*, and major civic leaders like Kenneth. As the Chancellor of the Fairbanks campus of the University of Alaska phrased it, "Our honorary degree recipients honor us."

Dr. Glenn Sheehan, executive director of the Barrow Arctic Science Consortium, completed the sentence with "...protecting the lives of scientists who might otherwise have perished under Arctic conditions." Dr. Toovak, as we salute him now, kept many researchers safe with Iñupiaq common sense. Dr. John Kelley, who sponsored the nomination for an honorary doctorate, is fond of recounting how Kenny dilly-dallied deliberately one fine morning, so that a boatload of eager researchers could not set out to sea until a storm that he knew was approaching made its presence felt. All those who were spared a nasty ordeal, or worse, were grateful for Toovak's wisdom.

The American Polar Society earlier honored Kenneth in 1998, the year after the Naval Arctic Research Laboratory, NARL, now known as UIC-NARL, celebrated its fiftieth anniversary in Barrow. Dr. Max C. Brewer, long-time director of the laboratory, could have finished the sentence by speaking of Kenneth Toovak's versatile problem-solving with heavy equipment operations. There are celebrated memories: of Kenneth supervising the move of an enormous steel fuel reservoir tank; of how he retrieved a Wien Airlines DC-3 that had slid off a gravel runway onto nearby sea ice; of his technique for levelling snow and ice on floating ice stations to fashion runways for airplanes; and (my favorite) of his backing a self-propelled landing barge into a sandbar that blocked one channel of the Colville River, thus using its propellers to dredge a channel.

Photo Courtesy Bill Hess, Running Dog Publications

Kenneth Toovak, Sr. having his hood adjusted by Chancellor Marshall Lind of the University of Alaska Fairbanks (left), and Mark Hamilton, President of the University of Alaska, 11th May 2003.

Adding special color to Commencement were drummers and dancers from Barrow's Suurimmaanitchuat Dance Group, led by Warren Matumeak. who opened the ceremonies with the Processional at the head of the thousand graduates and honorees in caps and gowns. Well-wishers traveled to the 2003 Commencement from as far away as Seattle (John "Jumper" Bitters, Dr. Robert and Reggie Rausch) and Portland (Ken Bennington), while others, like Dr. Max Britton, formerly with the Office of Naval Research, sent greetings from Washington DC. Toovak family members and close friends from Barrow, Anaktuvuk Pass, and Nuiqsut participated. Photojournalist Bill Hess ("*Gift of the Whale*") of Running Dog Publications recorded the festivities, and the writer, Charles Wohlforth is writing a personal profile of Dr. Toovak for *Alaska Magazine*.

To sum up his big weekend with one of the ever-modest Dr. Kenneth Toovak's own favorite terms, it was a grand expression of "sharing." ❑

Tundra Reveals Oldest DNA

by Rich Weiss

Scientists from Denmark, England and Russia have detected DNA from plants that lived 300,000 to 400,000 years ago—the oldest DNA ever found in core sediment samples from 100 feet deep in the Arctic tundra. The finds were especially surprising, they reported, because much of the DNA was not found in the remains of specific plants or animals, but was simply preserved in the frozen ground. That suggests that scientists need not be limited to studying fossil remains as they try to unravel the genetics of early evolution and discern what the ancient environment looked like.

Many of the ancient plant DNA samples, buried in frozen soil and Siberian ice in the region 'near today's Bering Straits, are from a gene involved in photosynthesis. Fragments were found from a variety of plants, including mosses, herbs, shrubs and trees.

Eske Willerslev of the University of Copenhagen and his team also found animal DNA sequences that appear to have come from woolly mammoths, steppe bison, reindeer, musk ox,' lemmings, hares and horses. The fact that so many of those animals were large herbivores suggests that much of the DNA had once been part of the rather prodigious loads of dung the animals produced.

By dating various samples and comparing their prevalence, the researchers were able to determine how the landscape changed thousands of years ago, documenting, for example, that the ratio of herbs to shrubs declined through the Pleistocene epoch and that sedges overtook grasses around the peak of the last glaciers, 22,000 to 16,000 years ago. Similar studies in New Zealand caves provided evidence of a number of extinct birds and other animals.

"This demonstrates that sedimentary genetic signals of plant and animal communities can be preserved for considerable periods, in both permafrost and temperate conditions," the scientists report in *Science Express*, the online version of the journal *Science*. ❑

Arctic Oil and Gas Digest

Assembled by Dave Norton, Arctic Editor

Events in the oil and gas arena seem to happen in spurts. Oil and Gas happenings were so slow six months ago that this "Digest" was skipped in the last issue of Polar Times. *This year, movement westward by the petroleum industry into the National Petroleum Reserve-Alaska (NPRA) became serious business for public debate before the Bureau of Land Management. In March and April, Congress returned to the long-stalled energy bill, and news stories once again erupted, despite the Bush Administration's preoccupation with Iraq. When the smoke cleared from the Congressional flurry of activity, little had changed—at least on the surface. With the U.S. military and Haliburton now controlling the second largest oil-producing nation in the world, it will bear watching whether White House and Senator Stevens' pressures to open ANWR's coastal plain to drilling have slackened. Elsewhere in this issue, Roland Gangloff and Dan O'Neill remind us how important geologists' research in Alaska in the 20th century was, both to the energy economy of the State of Alaska, and to the whole field of earth sciences worldwide. As a further reminder of perspective, Sonya Senkowsky's and Tony Fiorillo's articles focusing on the burgeoning field of Arctic dinosaur paleontology might not have been possible without the efforts of petroleum geologists, such as Robert Liscomb in the 1950s and 60s.*

Alaska Oil-Leasing Proposals Disclosed

***Associated Press*, WASHINGTON, 17 Jan 2003, by H. Josef Hebert**—The Bush administration announced new proposals Friday to open as many as nine million acres of Alaska's North Slope to oil and gas development, including some areas considered environmentally sensitive. The Interior Department released a draft proposal to offer oil and gas leases in the northwestern section of the government's National Petroleum Reserve, a vast stretch of Arctic tundra, lakes and ponds set aside in the 1920s for potential energy development.

The new document gives no preference to any of four options, but the government is expected to select a compromise that will offer large areas for drilling, while cordoning off some sensitive lands for environmental reasons. A decision will be made, possibly as early as this fall, on the extent of the oil and gas exploration and what areas will be protected. The land lies west of the long-established Prudhoe Bay oil fields on Alaska's North Slope. To the east of Prudhoe Bay is the oil-rich 1.5-milion-acre coastal plain of the Arctic National Wildlife Refuge, which has been the focus of heated debate in Congress over whether to drill there.

While development of the National Petroleum Reserve-Alaska, an area the size of Indiana, has generated nowhere near such controversy, environmentalists said Friday they feared the Bush leasing plan will include drilling in some sensitive areas important for the protection of migratory birds, whales and wildlife. Geologists believe the 22.5 million acres of the NPRA may contain six to 13 billion barrels of oil, compared to 3.2 to 11.5 billion believed beneath the coastal plain of the Arctic National Wildlife Refuge 100 miles to the east. But the oil in the reserve is more widely scattered and more costly to develop than it would be in the off-limits, more concentrated wildlife refuge.

One of four options proposed Friday would provide oil and gas companies access to about half the nine million acres, impose significant restrictions on exploration and drilling and put most of the area's coastal bays, lagoons, lakes and estuaries off-limits.

Under this proposal, only 2 percent of areas with high potential for oil and gas would be made available, a level of environmental protection that is unlikely to attract significant industry interest in the leases.

Another option would make available 96 percent of the land and all the areas with "high oil and gas potential," according to a summary of the document. This proposal would fence off from leasing the Kasegaluk Lagoon, a particularly environmentally sensitive area in the far western part of the reserve. It is known as home of beluga whales, spotted seals and the black brant, a migratory wild goose.This option would allow development of many of the other estuaries, coastal bays and lakes, although in some cases with operating restrictions, and probably would spur strong environmental opposition if adopted. Either of these two options could undergo some changes as the agency receives public comments in the months ahead. Two other options given Friday call for either opening all nine million acres without restrictions or offering no leases. Neither is expected to be considered seriously. ❑ ***(cb Billy-Ace Baker)***

Senate Rejects Drilling in Alaska Refuge

***Associated Press*, 19 March 2003, WASHINGTON, by H. Josef Hebert**—The Senate narrowly rejected oil drilling in an Alaska wildlife refuge Wednesday as eight Republicans defied party leaders and the White House on an issue at the core of President Bush's energy agenda. Drilling advocates said the plan was probably dead for this Congress. Despite intense lobbying by pro-drilling senators and the Bush administration, Democrats mustered the support needed to strip an oil drilling provision from a budget resolution expected to be approved later this week.

An amendment offered by Sen. Barbara Boxer, D-Calif., to scrap the provision passed 52-48. Development of the millions of barrels of oil beneath the 100-mile coastal plain of the Arctic National Wildlife Refuge in northeastern Alaska has been at the heart of Bush's energy plans. Environmentalists contend drilling there would jeopardize a pristine area valued for its wildlife, while the administration views the oil as key to curtailing America's dependence on imports.

All but five Democrats voted against refuge drilling, but eight Republicans bucked their party. Congress set aside the refuge in 1960 and declared the oil off limits unless a measure specifically lifted the ban. "It's unfortunate that the Senate missed an opportunity to increase America's energy independence at a critical time," White House spokeswoman Claire Buchan said.

Leading the pro-drilling charge was Sen. Ted Stevens, R-Alaska, who has substantial power as chairman of the Appropriations Committee. "People who vote against this today are voting against me and I will not forget," he declared, appearing to aim his remarks at Boxer in particular but also to wavering GOP senators. "When one of the most powerful senators says he takes it personally, and he's keeping a list. ... Well, my heart really started to beat faster," Boxer later remarked in an interview.

Stevens and other drilling supporters insisted that with government restrictions and modern technology the oil could be pumped without harming wildlife. "We're not using a lot of land," said Stevens, maintaining that the "footprint" of the oil wells would be less than 2,000 acres. But environmentalists countered that the footprint would be scattered over 1.5 million acres of coastal tundra, disturbing polar bears in their dens, affecting calving grounds for caribou and interfering with millions of migratory birds that swoop down on the plain each summer.

How much oil is beneath the refuge's coastal plain is uncertain because only one exploratory well has been drilled, and its results have not been made public. The Interior Department estimates that the plain could have anywhere from 5.7 to 16 billion barrels. Environmentalists argue that no more than about 3.2 billion barrels is likely to be economical for oil companies to pursue and that some major oil companies have begun to lose interest in the refuge. The United States uses about 20 million barrels of oil a day.

(CONTINUED ON PAGE 18)

ABOUT OUR CENTERFOLD

Mt. Erebus, McMurdo Sound
Artist: Robert C. Haun aboard Flagship TF-43, January 1956. Courtesy U.S. Navy Art Center, Washington, D.C.

(Continued from Page 15)

Democrats who voted against Boxer's amendment and for drilling were John Breaux and Mary Landrieu, both of Louisiana; Daniel Akaka and Daniel Inouye, both of Hawaii, and Zell Miller of Georgia. All five had voted in favor of drilling last year as well.

The eight Republicans who voted against oil development were Susan Collins and Olympia Snowe, both of Maine; Lincoln Chafee of Rhode Island; Gordon Smith of Oregon; Mike DeWine of Ohio; Peter Fitzgerald of Illinois; John McCain of Arizona, and Coleman. ❑ ***(cb Billy-Ace Baker)***

White House Persists in Alaska Oil Fight

Associated Press, **WASHINGTON, 30 March 2003, by John Heilprin—**Rebuffed by the Senate, the Bush administration will not give up the fight this year to open an Alaska wildlife refuge to oil drilling, Interior Secretary Gale Norton said. The White House is turning its attention to the House in hopes of salvaging a key part of the president's energy strategy. Republicans fell two votes shy in the Senate of passing the legislation that could lead to removal of a 43-year-old ban on developing millions of barrels of oil from the coastal plain of the Arctic National Wildlife Refuge.

"We continue to press about ANWR, because that one small spot is believed to have the ability to produce more oil than the entire state of Texas," Norton told people gathered for the National Wildlife Federation's 67th annual meeting on Saturday. On Friday, Senate Energy Committee Chairman Pete Domenici, R-N.M., who favors developing the refuge's oil, shot down rumors he might push the issue as part of a broad energy bill to be offered by his committee this summer. "I am not given to subterfuge. No means no," he said. The House still may revive the issue as part of its energy bill. Norton's Interior Department estimates 5.7 billion to 16 billion barrels of oil are in the refuge, enough to produce 1.4 million barrels a day, compared with Texas's 1 million.

Opponents argue the refuge feasibly might produce no more than 3.2 billion barrels of oil, depending on the market price. A common theme among the environmentalists who listened to Norton's speech or questioned her afterward was the worry that President Bush's policies cater to industry and shortchange wildlife such as caribou, muskoxen, polar bears and migrating birds at the Alaska refuge. "Wildlife refuges ought to be the one place where wildlife interests come first," said Clark Bullard of Urbana, Ill., an engineering professor who helps lead the Prairie Rivers Network environmental group. ❑ ***(cb Billy-Ace Baker)***

Scientists See Alaska Drilling Concerns

Associated Press, **WASHINGTON, 3 April 2003, by John Heilprin—**Oil drilling on Alaska's North Slope over 35 years has disturbed some endangered species and made whaling harder, but it has not caused significant oil spills or a large decline in caribou, a panel said Tuesday.

Oil from the North Slope, primarily around Prudhoe Bay, still accounts for 15 percent of the nation's total production despite reduced output in recent years. The National Academy of Sciences panel said in a report requested by Congress that development of the reserve since 1968 has produced large social and economic effects—some positive, such as better schools and health care, and some negative, like increased diabetes and alcoholism. It said the environmental effects continue to grow despite efforts by the oil industry and regulators to minimize them, including new technologies that have reduced off-road travel and made drilling platforms smaller.

The report, an 18-month effort costing $1.5 million, offers the most comprehensive look so far at the cumulative environmental effects of oil drilling in Alaska. It is expected to provide ammunition to all sides in an ongoing debate over whether to expand drilling into areas where it is now banned, including the adjacent Arctic National Wildlife Refuge.

"Continued expansion is certain to exacerbate some existing effects and to generate new ones—possibly calling for regulatory revisions," the report says. "Whether the benefits derived from the oil and gas activities justify acceptance of the inevitable accumulated undesirable effects that have accompanied and will accompany them is an issue for society as a whole to debate and judge."

The Bush administration welcomed the report. Christie Whitman, administrator of the Environmental Protection Agency, said it confirms drilling can be done safely. "It is important to note," Interior Secretary Gale Norton echoed, "that cutting-edge technologies would significantly reduce or eliminate a number of the effects cited by the academy." The report says abandoned equipment and buildings are likely to mar the landscape for centuries because state, federal and local overseers haven't decided how the landscape should be restored.

Bowhead whales have changed their migration patterns to avoid offshore seismic exploration, and some polar bear dens have been disturbed. Caribou herds shifted their calving areas to find vegetation and avoid insects. Predators such as arctic foxes, ravens and gulls have thrived, feeding on garbage around the oil fields, but they also prey on rarer and in some cases endangered birds, the report said.

Stan Senner, executive director of Audubon Alaska and a peer reviewer of the academy's findings, said the report debunks some of industry's claims that oil and gas drilling have not affected the environment. "There's now a scientific rationale for protection of some of these key areas on Alaska's North Slope," he said.

Ed Porter, an economist with the American Petroleum Institute, said the report shows industry has steadily reduced harmful effects on the environment. "There are some impacts that can't be eliminated but there continues to be tremendous progress," he said. Sen. Ted Stevens, R-Alaska, questioned the report's impartiality and said he was dismayed it was being used "as a weapon" to attack President Bush's top energy proposal, opening a small coastal area of the wildlife refuge to drilling. ❑ ***(cb Billy-Ace Baker)***

House GOP Revives Alaska Drilling Hopes

Associated Press, **WASHINGTON, 3 April 2003, by H. Josef Hebert—**The House is moving swiftly to enact energy legislation, hoping to revive a proposal for oil drilling in an Alaska wildlife refuge and, in a boon to farmers, expand the use of ethanol as a gasoline additive. Both provisions were included Wednesday as separate committees crafted key parts of the energy legislation. Lawmakers said they expected an energy bill to be voted on by the full House, possibly as early as next week.

The Senate will not begin writing a detailed energy bill until next week, although a proposal for $15.5 billion in energy tax incentives also was approved by the Senate Finance Committee on Wednesday. The House was to take up energy tax issues Thursday. As separate House committees crafted various parts of the energy package, it became clear that the push to open the Arctic National Wildlife Refuge was far from over, although the Senate two weeks ago rejected a drilling proposal 52-48.

"We're talking about a very small amount of land," Rep. Don Young, R-Alaska, said shortly before the House Resources Committee passed a package of energy measures that included opening the Alaska refuge to oil companies. "This nation needs the oil," he said.

Rep. Ed Markey, D-Mass., argued that drilling in ANWR's 1.5 million acre coastal plain would '"ruin the jewel of the national wildlife refuge system" and said more oil could be saved if the government imposed tougher fuel economy requirements on automobiles. But hours later, in another committee, a Markey proposal was rejected that would have forced automakers to make more fuel efficient cars by requiring a 10 percent reduction in gasoline use.

The Resource panel passed a series of financial incentives aimed at spurring production of oil, natural gas and coal. The bill would allow producers to forego paying federal royalties when developing deep offshore wells in search of natural gas in the Gulf of Mexico and off Alaska, remove limits on how many acres coal companies may lease and require the government to reimburse energy companies for the cost of meeting environmental reviews.

Rep. Nick Rahall, D-W.Va., called it "a buffet table" for the oil and gas industry.

"Robin Hood is turning in his grave," said Rahall, but a Democratic attempt to gut some of the royalty benefits was defeated 27-15.

Republicans called the industry incentives necessary to spur domestic energy production and get producers to drill high-risk wells. With a war in Iraq, "doesn't it make sense for us to adopt some sensible policies that will boost our energy security?" argued Rep. Richard Pombo, D-Calif., the Resource panel's chairman.

Meanwhile, the House Energy and Commerce Committee, working until nearly midnight Wednesday, wrapped up other parts of the energy package. The legislation would require refiners to use at least 5 billion gallons a year of corn-based ethanol in gasoline by 2015, a mandate that is expected to be a boon to corn farmers. The industry now produces about 2.5 billion gallons annually. When Rep. Lois Capps, D-Calif., sought to also ban MTBE, another gasoline additive, that has been widely blamed for contaminating drinking water, her amendment was turned back, 32-18. Instead, lawmakers approved liability protection for MTBE manufactures who might face environmental lawsuits.

Rep. Joe Barton, R-Texas, whose district includes MTBE manufacturers, said the refiners turned to MTBE because of federal clean air rules, and should not be penalized. Numerous states already are moving to phase out MTBE use because of environmental concerns, he said.

The House legislation also would:

- Give the Federal Energy Regulatory Commission authority to order the taking of private land for power line construction if a state does not act.
- Streamline federal approval of hydroelectric dams.
- Rescind a Depression-era law that restricted certain mergers among large power holding companies. Consumer groups argued the law shouldn't be scrapped unless FERC is given more authority to deal with merger abuses.

❑ ***(cb Billy-Ace Baker)***

Alaska Villagers Testify on Drilling

***Associated Press*, ANCHORAGE, Alaska, 5 April 2003, by Mary Pemberton**—Several members of the House Resources Committee heard testimony Saturday from residents of the only village inside the Arctic National Wildlife Refuge, where the Bush administration hopes to begin drilling for oil.

Robert Thompson, an Inupiat Eskimo wilderness guide in Kaktovik, told committee members he opposes drilling because of what it has done at Prudhoe Bay, an oil field about 100 miles away. "I've seen Prudhoe Bay, and I've seen the structures, the black smoke coming from the area, the roads, the infrastructure," said Thompson. "I would like to leave the land like it is for future generations."

Seven people from Kaktovik, a village of 306 people on Barter Island, testified Saturday. The village is part of the 19.6 million-acre refuge. George Tagarook, fire chief and former Kaktovik mayor, holds the more popular opinion in Kaktovik that drilling would be a good thing. "I think we are pretty sure we could drill in an environmentally sound way," said Tagarook, an Iñupiat Eskimo. He said drilling in the 1.5-million-acre coastal plain for its estimated 5.7 to 16 billion barrels of oil extends far beyond bringing better services to the village. "This is not a Kaktovik issue. It also will benefit the state of Alaska and the rest of the United States of America," Tagarook said. ❑ ***(cb Billy-Ace Baker)***

House Passes Pro-Development Energy Bill

***Associated Press*, WASHINGTON, 11 April 2003, by H. Josef Hebert**—The House approved nearly $19 billion in tax breaks Friday for energy companies and power producers and set up a showdown with the Senate over energy policy, particularly oil drilling in an Alaska wildlife refuge. The House-passed bill includes sweeping incentives for oil and gas development and a mix of tax and other financial breaks aimed at promoting the traditional fossil fuel industries.

And it revived the long-standing fight over whether to allow oil companies access to the millions of barrels of crude oil beneath the coastal plain of the Arctic National Wildlife Refuge in Alaska. Three weeks ago, the Senate rejected drilling in ANWR, as the refuge is called, and Democratic senators—including several running for president—have vowed to block any energy bill that would expose the refuge to development. ANWR drilling has been a top White House energy goal. The House and Senate also are taking different paths on energy tax incentives.

More than two-thirds of the $18.7 billion House proposal, covering 10 years, is aimed at helping natural gas, coal, and oil development. A slightly cheaper tax measure—about $16 billion—in the Senate focuses more on renewable energy, like development of wind power. Unlike the House, the Senate also gives a tax incentive to spur construction of an Alaska gas pipeline. The House bill was approved 247-175 after lawmakers rejected Democratic amendments to encourage energy conservation and reduce production subsidies. A proposal to require automobiles and sport utility vehicles to use 5 percent less fuel by 2010 failed, as did an attempt to eliminate the ANWR drilling.

President Bush called the House-passed legislation "a major step forward in the effort to secure our nation's energy future" and said he looked forward to prompt Senate action. The House-passed bill mirrors many of the energy priorities outlined two years ago by Vice President Dick Cheney's energy task force.

Rep. Billy Tauzin, R-La., who guided the bill through two days of floor debate, rejected criticism that the bill focuses too heavily on helping fossil fuel producers and not enough on getting people to use less gasoline and electricity. "Everyone has a different idea of what balance means," said Tauzin, whose state is a major energy producer. He said it may be "a little more pro-production" than pro-conservation but will improve energy security and give "a good shot in the arm" to the economy. First it must pass the Senate, which is expected to take up energy legislation next month. A Senate committee began working on an energy bill this week, approving some of the same measures in the House bill, including incentives for natural gas production and wider use of corn-based ethanol in gasoline.

But Tauzin acknowledged that the overall Senate bill likely will differ from the House-passed bill in some major areas, including Arctic refuge drilling and contentious issues involving the management of the nation's electric power grids. Last month, the Senate defeated a proposal to allow drilling in the Alaska refuge, 52-48. In the energy bill, which is subject to filibuster, drilling supporters would need 60 votes to get it included. Still, Tauzin was optimistic. "The Senate hasn't seen our best offer on ANWR," he told reporters Friday.

Sen. Joe Lieberman, D-Conn., one of several Democratic candidates for president who have vowed to block ANWR drilling, said, "Any plan to drill in the Arctic will be dead on arrival in the Senate."

While much attention has been on high-profile issues such as ANWR drilling and the lack of anything to boost automobile fuel economy, the bill includes a broad sweep of provisions aimed at helping utilities, oil and gas companies, corn producers, automakers, coal companies and developers of wind power. The oil and gas subsidies alone, complained Rep. Ron Kind, D-Wis., "will put hundreds of millions of dollars into the already deep pockets of the major oil companies." The bill's supporters said small oil and gas developers will be the primary beneficiaries, not the oil giants. House Republicans turned back attempts to encourage more energy conservation. Although the bill contains some tax breaks for buying solar heating equipment and more efficient appliances, it makes no attempt to improve auto fuel economy. Asked about this, Tauzin cited the significant incentives to develop hydrogen-fuel vehicles, which many believe are decades away from showrooms.

While broadly praising the House-passed bill, the White House questioned the size of the $18.7 billion tax subsidies, twice what the president sought. Even a favorite administration fuel efficiency proposal—a $2,000 tax credit for buying gas-electric hybrid cars—was omitted. Tauzin said it might be added when the House and Senate bills are reconciled. ❑ ***(cb Billy-Ace Baker)***

Train Oil and Snotters: Eating Antarctic Wild Foods

by Jeff Rubin

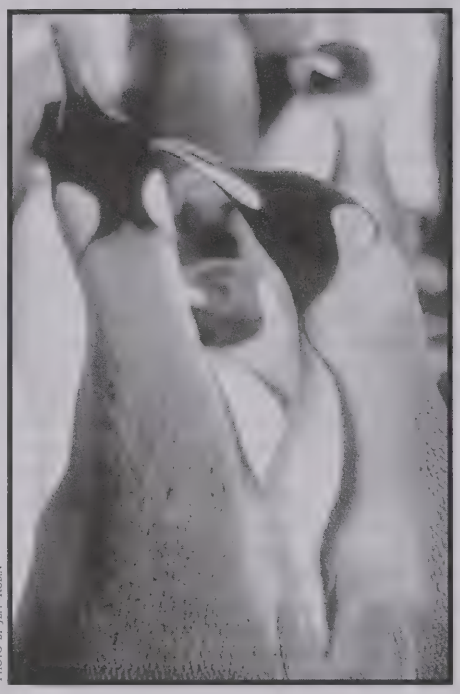


Photo by Jeff Rubin

King Penguin at Kerguelen

EDITOR'S NOTE: This is the second part of a two-part series. An expanded version, with footnotes, appeared in the Winter 2003 issue of the journal *Gastronomica*, published by the University of California Press.

Naturally the bird most identified with Antarctica did not escape uneaten. "If they became too impertinent," one of Amundsen's men wrote of the little Adélie penguins, "we did not hesitate to take them, for their flesh, especially the liver, was excellent." Similarly, Albert Armitage, second-in-command on Scott's "Discovery" expedition, wrote in 1905, "Numbers of Adélie penguins visited us, and not a few of them found their way into our cooking pots, for they were exceedingly good eating."

J. Inches Thomson, a Macquarie Island sealer, went even further, writing in 1912, "Our very good friends, the penguins, deserve a chapter to themselves, as we were very much indebted to them for sustenance and health, for thousands of eggs and many a savoury stew..."

"Because of the powerful pectoral muscles developed for swimming, the meatiest part of a penguin is its breast," says Phillip G. Law, 90, leader of the Australian National Antarctic Research Expeditions from 1949 to 1966. "The dense muscle meat resembles ox heart. My favorite recipe is to thinly slice the breast and fry it with a coating of egg and bread crumbs in the fashion of a wiener schnitzel."

"Some of us regarded penguin as a delicacy," wrote Adm. Richard Byrd. "It is a very dark, rich and gamey meat and tastes like nothing that we have in civilization." Paul Siple, however, wrote that penguin meat was "not too delicate of odor and had a 'gamey' taste."

Frederick A. Cook, surgeon on the Belgica expedition, is often quoted for his memorable description of the taste of penguin in *Through the First Antarctic Night* (1900):

> "It is rather difficult to describe its taste and appearance; we have absolutely no meat with which to compare it. The penguin, as an animal, seems to be made up of an equal proportion of mammal, fish, and fowl. If it is possible to imagine a piece of beef, an odoriferous codfish, and a canvas-back duck, roasted in a pot, with blood and cod-liver oil for sauce, the illustration will be complete."

Picturesque, no doubt, but Cook and his men actually *liked* penguin. "We have begun to eat penguin meat," he wrote in the passage immediately preceding the above:

> "The doubtful recommendation it has received from other explorers has caused us to shun it; but now, for variety, we would gladly take to anything....We have tried the meat several times, and it seems to improve upon acquaintance....No one seemed to eat the penguin steaks with any kind of relish, but somehow we stored away quite a little stack of it."

Cook also described how his men used a cornet to exploit penguins' well-documented fondness for music—"when they hear it they make directly for the ship, and remain as long as the music lasts....In this manner we have only to wait and seize our visitors to obtain penguin steaks, which are, just at present, the prize of the menu."

Cook's description is infamous enough that other explorers even referred to it in their own works. Scotsman R. N. Rudmose Brown wrote in 1906:

> "Penguin was a staple article of meat diet. At first the crew showed some objection to it, but in the course of the winter they learned to like it as well as we did, and asked for nothing better. Some Antarctic expeditions have found penguin utterly unpalatable....I must really protest against [Dr. Cook of the *Belgica*'s] caricature; and while I admit its dark red-black appearance is unusual, and that it cannot be compared in taste to anything I know, I yet must bear testimony to its excellence as a food. When we no longer could get it we sorely missed it, and drew comparisons between it and mutton far from favourable to the latter. I think it would be well worth while to establish penguin rookeries on many of the barren rocks off the western isles of Scotland, and so introduce a new and delicious food to the inhabitants of this country."

Odd-Looking But Delicious

For a brief period in the Antarctic springtime, another wild food was readily available in certain areas. "The [Adélie] penguins were now laying," wrote Shackleton in *The Heart of the Antarctic* (1909),

> "...and the men found that the eggs were very good to eat. The egg of the penguin is about the same size as that of a duck, and it has a transparent, jelly-like white and a small yolk. It takes about eight minutes' boiling to cook the egg nicely, and ten minutes if it is required to set hard to the centre."

"They were indeed a luxury to all on board in whatever form they were partaken of," wrote Rudmose Brown,

> "...boiled or fried, scrambled or in omelettes, cooked or raw. No one could be satisfied for many days, and, in some shape or other, eggs were the principal constituent of every meal, and of various irregular meals interpolated when hunger prompted. For the first fortnight that eggs were obtainable the average daily consumption of all hands was fifteen a-head, not counting various raw ones that did not pass through the cook's hands."

Briton Wally Herbert added,

> "It is about as difficult to disguise a penguin egg as it is to disguise an Englishman....the 'white' of a penguin egg when cooked looks like a semi-transparent jelly and the yoke [sic], which is a bright orange, can be seen in a green firmament like a setting sun. A couple of fried penguin eggs on a white dinner plate look like two bloodshot eyes."

Winged Veal

Albatross was a favorite dish from the time of Capt. Cook's voyage in HMS *Endeavour* in 1768. Naturalist Joseph Banks, who accompanied Cook, wrote that the albatrosses "were so good that every body commended and Eat heartily of them tho there was fresh pork upon the table."

Young albatross was the first food eaten by the crew of Shackleton's *James Caird* after their epic 16-day crossing from Elephant Island to South Georgia. Frank Worsley described the meal:

> "When the dish was cooked, we reveled in unwonted gluttony—the delicious, white, well-flavoured and rich flesh was rendered even more piquant by the ad-

> dition of hoosh and a little salt, which we had been able to save in a hermetically sealed tin. How we stuffed! For once there was no stint. We even ate the bones, as they were soft and juicy....[we] discussed making enough money to start another expedition by taking some hundreds of baby albatross and selling them to the epicures, gourmets, gourmands, gluttons and whatnots of Europe and New York at £50 a piece..."

Albatross eggs contain as much as a pint. "A fried molly [albatross] egg fills a tin dinner plate and the edge hangs over the rim," wrote L. Harrison Matthews, a British naturalist who sailed on whaling and sealing voyages. The thick-walled eggshells were used by sealers and shipwrecked sailors as oil lamps and conveyances for "message-in-a-bottle" pleas for rescue.

Other Birds

A wide variety of other birds were also consumed.

In general, wrote Alexander H. Macklin, a surgeon on Shackleton's *Endurance* expedition, "...seabirds have a rather strong taste of oil and fishiness, which can largely be removed by soaking them in dilute vinegar for twenty-four hours."

Shags were quite popular with Gerald T. Cutland, the cook at Britain's Argentine Islands base in 1957-58, who wrote, "To those people who have Shags (or Cormorants) in their vicinity and have not included this bird in their diet I would say they are missing one of the luxuries of the Antarctic and my advice is that if you see any around, take a .22 rifle and knock a few off. It is a very meaty bird and one is enough for about 6 people." Cutland prepared Roast Shag, Shag Maryland, Spanish Paella with Shag, Casserole of Shag, Fricassee of Shag, Jugged Shag, Fried or Grilled Shag and Savoury Hot Pot with Shag.

Skuas are "not unlike duck," according to Alan Gilchrist, who wintered on Heard Island in 1948, and Law gives this recipe for skua: "Pluck feathers, strip off all blubber, wipe off blubber oil with an alcohol-soaked rag, then roast. The product is like roast wild duck."

Sheathbills were "very good eating....we often made a hearty meal on them," wrote Matthews, and Thomas Orde-Lees wrote in his *Endurance* expedition diary: "Notwithstanding that they are carrion feeders we consider that they taste delicious, but then I think we should say the same of owls or rats if we had them here in our present straitened circumstances."

'Cabbages' & Seaweed

Because their voyages often lasted for years, sealers and sailors were anxious to secure fresh vegetables at their landfalls, both for nutritional reasons and as a change in diet. Two similar plants found on sub-Antarctic islands—Macquarie Island cabbage and, especially as its taxonomic name implies, Kerguelen cabbage (*Pringlea antiscorbutica*)—are excellent sources of vitamin C.

"The so-called 'wild cabbage,' undoubtedly an effective [scurvy] remedy, grows abundantly over the whole island," wrote Fabian von Bellingshausen, who completed the second-ever circumnavigation of Antarctica in 1821, upon visiting Macquarie in 1820.

> "The roots resemble cabbage in flavour. The sealers scrape the stalks and roots, cut them up very fine and make soup of them. We took a lot of these cabbages with us and preserved them for the use of the crew, the roots being pickled for the officers' mess. From the preserved cabbage we made a very tasty shtshi [Russian cabbage soup], and we were sorry that we had not prepared more."

In his study of Macquarie Island's vegetation, B.W. Taylor wrote of the cabbage: "The petioles taste like celery when cooked; pickled rhizomes like turnips; and leaves when cooked like wet blotting paper."

At Kerguelen, the endemic cabbage was also important to the rare visitor. British botanist Joseph Hooker, who established his career by sailing as the assistant surgeon on one of Ross's ships during his Antarctic voyages from 1839 to 1843, called the cabbage "perhaps the most interesting plant procured during the whole voyage in the Antarctic." Of its utility, he wrote:

> "To a crew long confined on salt provisions, or indeed to human beings under any circumstances, this is a most important vegetable, for it possesses all the essentially good qualities of its English namesake, whilst from its containing a great abundance of essential oil, it never produces heartburn or any of those disagreeable sensations which our pot-herbs are apt to do....The root tastes like horse-radish, and the young leaves or hearts resemble in flavor coarse mustard and cress."

Fuller struggled to describe the plant's unique tang: "I do not know of anything that I could possibly compare it with as regards flavor. It has got a slight bitter taste, which I am sure could be removed by a little cultivation. I myself, and I have heard other persons express their opinion on it, prefer it to the best cultivated cabbage."

Seaweed was tried by several groups of castaways, but even in their desperate straits, they did not like it. Raymond Priestley, a member of Scott's castaway "Northern Party," which was starving as even their native foods began to dwindle, attempted to dine on "old dried seaweed from the beach, the same material which we were using to sleep on...it had lain, probably for a century or so, on the beach well above high-water mark":

> "...it tasted like essence of must and mildew, and reminded me of what I should expect a concentrated solution of Old Masters to taste like. If one were to strip walls of the National Gallery, throw the canvases into a huge caldron and boil them for seven weeks, I fancy the resulting soup would have tasted very like our Evans' Coves seaweed." ❑

Photo by Jeff Rubin

Kerguelen Cabbage at Heard Island

"Escallops of Penguin Breasts"

Penguin Breasts as required
Reconstituted onion
Some fairly thick batter
Flour
Salt and pepper to taste

Cut the breasts into thin slices and soak in milk for about 2 hours. Dry, season and flour them well on both sides. Have ready some deep frying fat. When just smoking hot dip the pieces in the batter with the onion mixed into it and fry each piece to a nice golden brown. For a sauce turn the contents of a tin of mushroom soup into a saucepan and heat but do not boil. When hot pour over the meat and serve with fried potatoes and peas. ❑

— from Gerald T. Cutland's *Fit for a FID, or, How to Keep a Fat Explorer in Prime Condition* (© British Antarctic Survey)

I am grateful to Dr. Phillip G. Law for sharing his personal taste impressions of Antarctic wild foods. I would also like to thank Ms. Margot Morrell for providing me with excerpts from her transcriptions of the diaries of several members of the Endurance expedition and Dr. David Walton and Ms. Christine Phillips, both of the British Antarctic Survey, for providing me with a copy of Gerald T. Cutland's cookbook.—J.R.

South Pole Station Construction Update

by Jeff Rubin

NSF/USAP photo by Robert Schwarz, AMANDA

At last—a room with a view! A toast is offered at the first dinner served in the new South Pole station.

Carlton Walker is a cool customer, even measured by the standards of those stalwarts building the new South Pole station.

"Refuse to Lose" is the mantra of the man who oversees the day-to-day construction project while bearing the unwieldy title of Facilities, Engineering, Maintainence and Construction Manager.

"'Refuse to Lose'" just came about because every year is a new year," Walker explains. "We can plan and plan for eight months, but as soon as you get in the field, it's all up for grabs again. As soon as you get a week of flight delays, as soon as you get a part of the design that doesn't work out, it can't stop you."

"We can't let the progress of the project slow down," he insists. "You just can't give up, ever. 'Cause if you do, it's done, it's over."

That kind of dedication in the face of adversity was a necessary attribute this season, as flights were repeatedly postponed or cancelled by weather.

By station closure at the end of the summer, the project was short by 30 flights and nearly three-quarters of a million pounds of material.

"We've had weather at McMurdo and Pole that we haven't seen in years," says construction project manager Jerry Marty. "That continues to put us in a 'Need and Feed' scenario. We were fortunate that we had enough locations to allocate the workforce around—but to be honest, it's not the most efficient way to work. They pick up their tools and walk from one wing to the next, then the materials come in, and they walk back. You lose the continuity, and the production efficiency."

This year's goal was completion of sections A-1 (winterover housing) and A-2 (food service and dining), allowing the first residents to occupy the futuristic facility.

"The key was to complete the construction, perform the necessary inspections, and ensure that we complied with all codes and standards," says Marty, "and to achieve this by Feb. 15."

Thanks to some minor problems, the station was not officially occupied until March 3rd (03/03/03). The first official meal in the bright, window-filled galley was celebrated in high style on March 15.

Now wintering at Pole are 58 people, including nine scientists, 24 construction crewmembers, and 25 support personnel.

Only 40 are living in the new station. Although the capacity of section A-1 is 50, "we still have folks living in the Dome complex," Marty says, since several major station operations—including science, communications, administration and recreation—are still headquartered there.

The winterover crew was split because of limited space in the new station and also because a minimum number of personnel was required in the Dome to help in case of a fire.

"It won't be the last winter that anyone will be in the Dome," Marty says. "We have at least one more year in the Dome. That was one of the interesting scenarios: who gets to go where, and who makes that decision. Some people said, 'I want to stay in the Dome, because when I come back in two years, I won't have that opportunity.' "

Despite a previous report in the Fall-Winter 2001 issue of the *Polar Times*, not every room at the new station has a window. Rooms around the outside wall of each section have windows, but a center row of rooms open onto a hallway and do not have windows. The newly-opened A-1 section has 24 rooms on the first floor, six of them windowless center rooms, while eight of the 26 second-floor rooms are windowless.

In fact, some residents of the station prefer not to have windows, Marty says, since the 24-hour summer daylight then does not interfere with their sleep.

Another unforeseen difficulty this year was the sinking of the new station's support columns into the snow at a rate faster than anticipated. Although the station is designed to allow minor levelling annually to account for differential settling of the compacted snow pad on which it is built, some of the settling was man-made.

"We had a snow ramp on the back of section A-1 which we needed for moving materials into the station summer and winter," Marty explains. "The design had not allowed for that additional loading on that end of the pad. We put quite a large weight on the corner, enough that it created this acceleration of the settlement."

Using hydraulic jacks, sections A-1 and A-2 were raised by as much as 2.5 inches at different locations. Plywood shims were inserted under the grade beams to correct the problem.

Meanwhile, the fate of the old Dome is again being debated, with the idea of disassembly "back on the table," Marty says. One possible site for re-erection: the Navy Seabee museum in Port Hueneme, Calif.

Another idea under consideration, if disassembly proves impractible or unaffordable, he adds, is the production of small souvenir-type coins, nicknamed "Dome-ites."

For next season, some building materials have already been flown up to Pole, meaning that "some of the first activities can get started right away, even if flights don't make it in," Marty says. "But it will be a very short period of time before we will have consumed those materials."

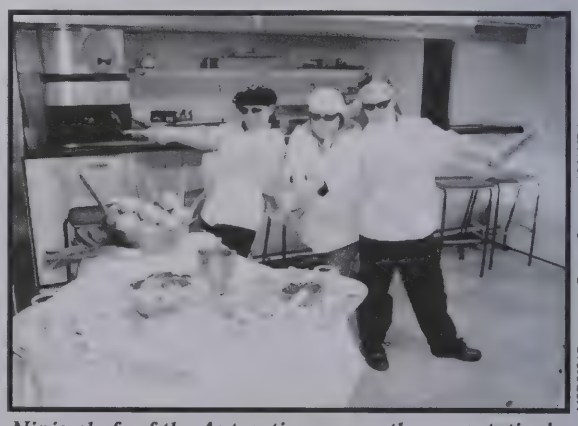
Next season, beginning Nov. 1st, there are 135 McMurdo-to-Pole flights planned just for construction, about the same number as this year. In 2004-2005, only 116 construction flights are planned, with the number dropping in the next two seasons to 41 and just 14 as the station nears total completion.

"It's doable as long as the weather cooperates," Marty says. "That's been the nemesis for two seasons, the 100-year storm."

Adds the Zenlike Walker: "We have another saying: 'Easy Blows.' If it was easy, anybody could be doing it." ❑

Seabees Souvenir

A long-buried souvenir of the last major South Pole construction project was found this season: a four-by-eight foot piece of plywood on which are written the names of the Navy Seabees who constructed the Dome and arches during Operations Deep Freeze '72, '73 and '74. The plaque was packaged and sent via vessel this summer season to the Seabee museum in Port Huenume. For a photo and the complete list of names, visit the American Polar Society website.



NSF/USAP photo by Robert Schwarz, AMANDA

Ninja chefs of the Antarctic prepare the new station's first meal.

Antarctica's Rising Tide

Due South

By Jeff Rubin, Antarctic Editor

Antarctic tourism is booming—making it likely to be a hot topic at the next Antarctic Treaty meeting to be held June 9-20 in Madrid.

About 13,200 visitors went ashore in Antarctica last season, a number that nearly equals the record set in 1999-2000, when the global economy was humming and millenium tourists flocked to The Ice.

In addition to the 13,200 tourists this year, several thousand more either flew over Antarctica ("flightseeing") or cruised in Antarctic waters without making a landing.

For the first time, a total of more than 100,000 passenger-landings were made in a single year, nearly all of them within the relatively confined area of the Antarctic Peninsula as far south as the Lemaire Channel.

This growth in tourist numbers looks certain not only to continue, but to increase even further over the next few years. The Australian government's authoritative newsletter *ANAN* (*Antarctic Non-Government Activity News,* available on the web at www.aad.gov.au/default.asp?casid=4974), produced by the indefatigible Martin Betts who recently retired after 37 years with the Australian Antarctic Division, is chock full of interesting data.

Numbers for next season, 2003-2004, are eye-opening:

- 31 different ships plan 170 tourist voyages to Antarctica and the sub-Antarctic
- 27 ships (compared with 19 last season) are to operate in the Antarctic Peninsula region, offering a record number of passenger berths for sale: more than 22,000.
- 9 of the 27 ships will be visiting Antarctica for the first time
- 8 of the 27 ships can carry more than 500 passengers: *Amsterdam* (1,380), *Marco Polo* (800), *The World* (650), *Saga Rose* (587), *Asuka* (604), *Olympia Explorer* (836), *Discovery* (650) and *Royal Princess* (1,200).

The last six of these large vessels are among the first-time visitors. Significantly, Lloyds of London data indicate that of the big ships, only *Marco Polo* and *Saga Rose* have ice-strengthened hulls.

To those who still think of Antarctic tourism as being conducted mainly aboard smaller ships, many of them former Russian research vessels—which was true until only recently—it will be a shock to learn that most new Antarctic tour vessels are enormous, gleaming white cruise ships more commonly found in the Caribbean or Mediterranean. Indeed, *Discovery* is the former *Pacific Princess*, which was featured on the 1970s TV show "The Love Boat."

The larger ships, which typically carry crews at least half the size of their passenger capacities, present huge search-and-rescue challenges if one ever runs aground or unexpectedly meets an iceberg. A fuel spill by one of them could be an environmental disaster, for the big ships use molasses-thick heavy bunker oil for fuel, not diesel, which is lighter and more easily dispersed.

Against this background of major and potentially-problematic new growth, the annual meeting of the International Association of Antarctica Tour Operators (IAATO), held this year from May 5 to 8 in Seattle, offered a fascinating look at the changing industry.

In 2001, IAATO rewrote its bylaws to allow—for the first time—ships carrying more than 400 passengers to become IAATO members and to land passengers. Ships carrying more than 500 passengers must "cruise only" if they wish to be IAATO members. No IAATO ships may put more than 100 passengers ashore at one time.

Ring-shaped Deception Island is one of Antarctica's most popular visitor sites...so it's thought-provoking to read that volcanologists consider Deception very likely to erupt at any time, with little or no warning.

With that 2001 bylaw change, IAATO said it would develop restrictions on the location and timing of landings by big (200-500 passenger) ships. Because IAATO has not yet developed these restrictions, however, the large vessels have been able to land passengers wherever they liked for the past two seasons. Naturally, the complicated logistics of getting hundreds of passengers safely ashore and back provides limitations of its own.

Whenever IAATO publishes its list of approved big-ship landing sites, perhaps as soon as this year's Treaty meeting, it will make for very interesting reading—and likely spark debate about its choices.

Governments, however, are not waiting around for IAATO to self-regulate. While the issue of sovereignty continues to be a vexing problem (no one owns Antarctica), some sub-Antarctic islands and all Antarctic stations can restrict their own visitor traffic. This year, the popular tourist site of Port Lockroy, a former British research station, will begin limiting tour ship numbers.

South Georgia, still reeling from a record 45 tour-ship visits last season (a 32 percent increase over its previous high of 34 visits), is now considering new regulation as well, particularly for the sensitive wildlife breeding areas of Albatross and Prion islands.

Other trends in Antarctic tourism discussed at the IAATO meeting include:

- **Adventure Tourism:** More "adventurers" have been heading to Antarctica in recent years for high-risk activities. IAATO members and national governments are contemplating ways to ensure that such "extreme tourists" come adequately prepared for Antarctic conditions.
- **Families:** Particularly during Christmas and New Year's holidays, more families are visiting Antarctica, some with children as young as five years old. One recent 96-passenger cruise had 27 passengers younger than 18 years old; ship staff included an "activity coordinator" to entertain them. An 11-year-old tourist, meanwhile, visited the South Pole in Dec. 2002.
- **National Governments' Tourist Interests:** Several countries, smelling profit in Antarctic tourism, have become directly involved, not only competing unfairly with commercial operators, but also compromising their impartiality when voting on tourism regulations. Russia has begun flying tourists from South Africa to its Novolazarevskaya base, often for "adventure tourism," and the Argentine air force operates twice-weekly summertime tourist flights from Ushuaia to the country's Marambio scientific base at Seymour Island. Argentina and Chile also have strong vested interests in promoting their southern ports as Antarctic "gateways," giving them another stake in Antarctic tourism.

* * *

Ring-shaped Deception Island is one of Antarctica's most popular visitor sites—and a likely candidate for inclusion on IAATO's big-ship-approved landing site list, so it's thought-provoking to read in a new British Antarctic Survey (BAS) publication, "GeoMap: Geology and Geomorphology of Deception Island, 2003," that volcanologists consider Deception very likely to erupt at any time, with little or no warning.

In a section titled "Escape Strategy" for visitors to the volcanic island, the BAS publication advises: "If ships are present within Port Foster [Deception's inner harbor] when an eruption occurs, they should depart the island immediately, ideally after uplifting all people ashore."

Ideally, indeed. ❑

I am grateful to the American Polar Society for financial support to attend the IAATO meeting.—JR

Around and Around She Goes...

The Russian Icebreaker *Kapitan Khlebnikov* successfully circumnavigated the Antarctic continent for the second time with passengers within the span of five years.

by Abel Shafer

Antarctica is the fifth largest continent with an area roughly of 5.3 million square miles.

For over 210 years, starting with James Cook's first voyage circumnavigating Antarctica in 1773, until 1982-83 when the *USCG Polar Star* sailed around the continent, there were a total of only nine such voyages. They were for the purpose of exploration, discovery, and science. The *Kapitan Khlebnikov*'s voyages give her the distinctive honor of doing the 10th and 11th circumnavigations; she is the first ship to have twice circled the Ice.

Despite unknown factors of weather, crossing some of the most torturous, wild seas and inhospitable ice conditions which could change from year to year, hour by hour, in Antarctica, Quark Expeditions of Connecticut planned a bold, imaginative, innovative and possibly financially risky Antarctic journey with farsighted possibilities in Antarctic tourist travel—the full circumnavigation of Antarctica aboard the Russian Icebreaker *Kapitan Khlebnikov*.

The first circumnavigation by the *Kapitan Khlebnikov* started November 24, 1996, from Port Stanley, Falkland Islands, and returned after 66 days on January 27,1997, with the successful full circumnavigation of Antarctica. It had sailed 12,565 nautical miles (23,245 kilometers) eastward around the continent.

The *Kapitan Khlebnikov* left for the second circumnavigation from the port of Lyttleton, New Zealand, on November 26, 2002, successfully circumnavigating the Antarctic continent in another 66-day voyage, this time in a westward direction. It had sailed 12,886 nautical miles (23,465 kilometers).

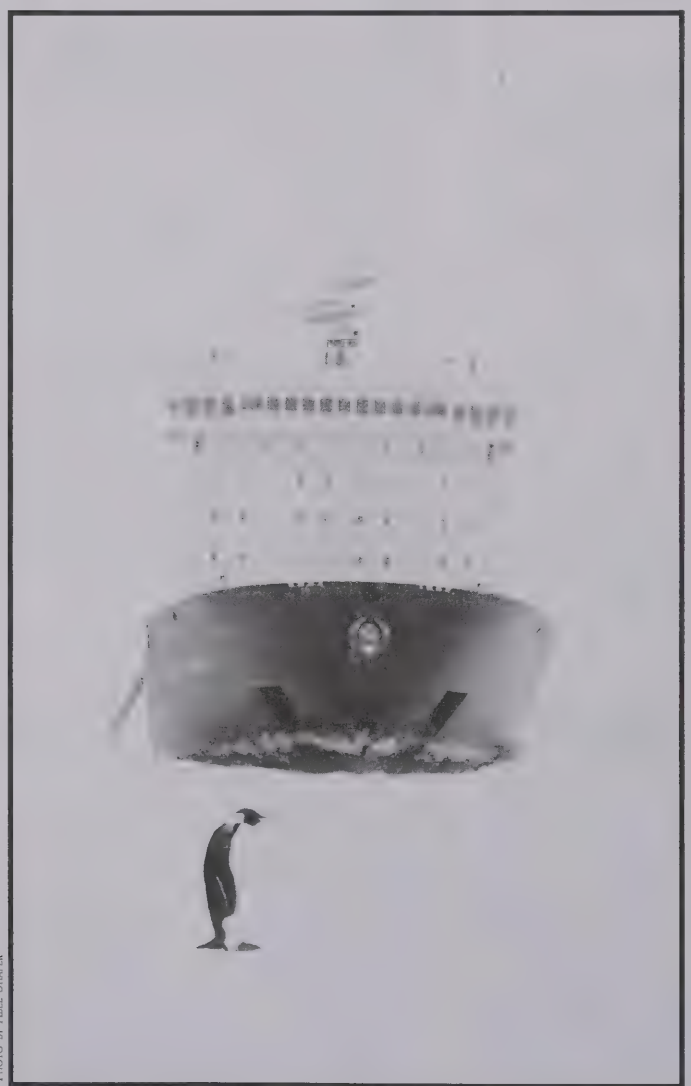


Photo by Abel Shafer

A penguin strolls past the bow of the Kapitan Khlebnikov *at the Riiser Larsen Ice Shelf, Weddell Sea, Antarctica (12/28/02).*

The Russian icebreaker *Kapitan Khlebnikov* was built in Helsinki, Finland in 1980 by the Wartsila Company as a working icebreaker for the seas of northern Siberia. It was refurbished as a passenger ship in 1992.

The following are its specifications: length, 428 feet; breadth, 87 feet; draft, 28 feet; 12,288 tons; engines, six Wartsila diesel-electric; 24,000 total hp; ice class, KM*LL3A2; cruising speed (open water), 15 knots; crew, 60; passengers, 112; registry, Russia.

The ship has a fleet of six Zodiacs to transport passengers to beach landings on isolated islands to see seal, penguin or birds that inhabit and breed on a particular island. Zodiacs navigate through the ice floes for ship-to-shore transportation or sightseeing cruises.

An important facility integral to the *Kapitan Khlebnikov* and unavailable to other cruise ships sailing Antarctic waters are two helicopters. Used primarily for reconnaissance of ice conditions and navigation, they are also used to transport passengers to inland research stations from the ice-bound coasts. It is considered a special treat when the helicopters are used to land passengers on top of tabular icebergs, glaciers or on large ice floes from where they can watch the *Kapitan Khlebnikov* sail by about 100 feet from the edge of the ice floe. The helicopters also carry the passengers to penguin rookeries, which usually are surrounded by grounded icebergs in the fast ice. Flights to the Dry Valleys amidst snow-covered peaks become hands-on theatre for the staff geologists to explain the geological history of these unusual areas.

One can see jagged, black, lightning-quick lines split the ice as it gives way to the advancing powerful juggernaut. It is mesmerizing.

Standing at the bow, or 90 feet above, in the comfort of the bridge, one watches the ship ram its way into ice floes three to four metres thick to force a path for the ship, or push ice floes 300 by 300 feet into ice ahead. One can see jagged, black, lightning-quick lines split the ice as it gives way to the advancing powerful juggernaut. It is mesmerizing.

Ice conditions constantly change. The weather can change from minute to minute; the sky does the same, from cloudy to impenetrable dense fog, to clear blue and to brilliant sunshine, all within the hours of one day.

For the adventurous souls who want to participate in a journey to the unknown and rarely seen Antarctic in a manner not available on regular cruise ships, the *Kapitan Khlebnikov* is the ship of choice.

Along with me were 10 other proud and happy souls who made both circumnavigations of Antarctica as voyagers aboard *Kapitan Khlebnikov*. ❑

Abel Shafer has been a frequent and consistent contributor to the* Polar Times *for many years. This is his first bylined article published in the magazine.

U.S. Polar Rock Repository to Open in October

by Jeff Rubin

A new national facility, the United States Polar Rock Repository, is currently being built adjacent to Scott Hall, home of the Byrd Polar Research Center at Ohio State University in Columbus, Ohio.

The new repository will include hand-collected rock specimens; other U.S. repositories already exist for Antarctic ice cores, sediment cores, meteorites and Southern Ocean specimens.

Construction is due to be completed in late June 2003, and the opening ceremony is scheduled for Oct. 11, 2003, immediately following the American Polar Society symposium (see insert in this issue).

The repository will house rock collections of U.S. scientists from Antarctica and the Arctic, along with associated materials such as field notes, annotated air photos and maps, raw analytic data, paleomagnetic cores, ground rock and mineral residues, thin sections, and microfossil mounts, microslides and residues.

Many geologists have rocks stored in their garage or basement, so many collections are not in permanent storage, says Rosemary Askin, a geologist at Ohio State University who led the effort to seek funding for the repository. Askin herself has collected several thousand samples from Antarctica, which she has donated to the repository.

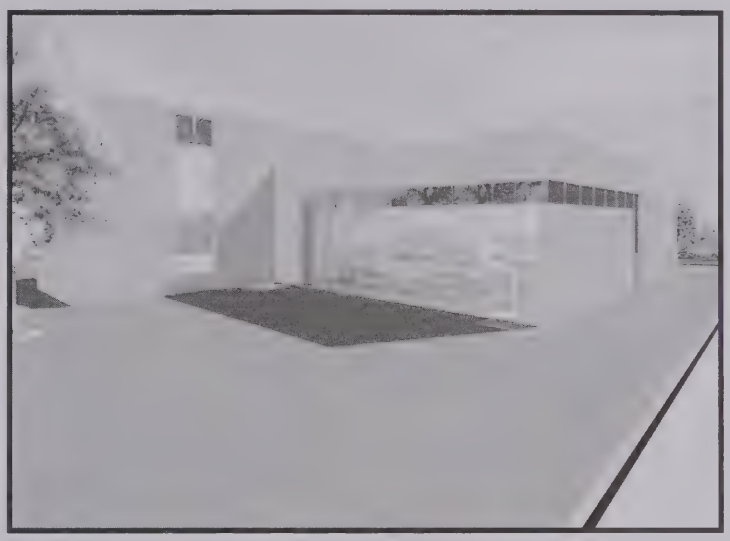
"It's been a long time in coming," says Askin's colleague Peter Webb, professor of geological sciences at Ohio State, explaining that many geologists active in collecting in Antarctica during the 1950s and 60s are now "getting fairly senior," so there's a definite risk that their samples—often gathered at great expense—could be lost.

Fortunately, rocks have an unlimited shelf life—and new analytical techniques continue to make old samples useful and interesting.

> *"If everyone takes a little souvenir," Webb says, "you know what happens after a while."*

"When you cost up what it took to collect them, it is embarrassingly high," Webb says. "Each sample is worth thousands of dollars, and if it's sitting in the U.S., you can quite often do a meaningful project without going to Antarctica, or you can do a preliminary survey here in the U.S. and then go to Antarctica if you need to. So often we go to Antarctica and reinvent the wheel. I have seen many, many people collecting and collecting and collecting, and it wasn't really necessary. They could have come to me, and I could have just loaned them something. There's a lot of wasted effort."

In fact, some researchers feel so strongly about the repository's potential to eliminate duplicated effort that they think it should be a mandatory preliminary research site prior to any travel to the Antarctic. Ohio State University geologist David Elliot told the *Antarctic Sun* newspaper, "In the future I believe the repository should be a data source that anyone proposing a new investigation must examine and reference in order to demonstrate that they really do have a requirement to go in the field."



Artist's rendering of Polar Rock Repository.

Some sites have been visited by a field party just once, rendering their samples nearly as geologically valuable as lunar materials.

Other locations in Antarctica have been ruined by overuse, Webb says. "There are outcrops that I sampled in the late '50s and '60s, and those outcrops don't exist anymore—so that material will be very valuable," he says, citing Scallop Hill on Black Island in southern McMurdo Sound and the Pecten Gravels east of Lake Vanda in Wright Valley as just two examples of important fossil deposits that have been "heavily sampled" by curious visitors as well as by scientists. "If everyone takes a little souvenir," Webb says, "you know what happens after a while."

Another good example of lost geological material occurred at McMurdo Station itself. In 1955, Webb says, the ground surface of southernmost Ross Island was littered with volcanic bombs (from local eruptions) and numerous large and spectacular nodules of olivene crystals. Over the years these were either collected by geologists and the curious, or lost during the bulldozing that preceded expansions of the station. "Again, we would hope that anyone in possession of such material might consider donations to the Rock Repository for display and future research," Webb says.

Samples will be stored at the repository on 12-foot-high compactible shelving. There will also be a rock preparation room with rock saw and drill press, work and layout areas, office and discussion areas, plus computers and microscopes.

Several other countries doing research in Antarctica—among them, Australia, Germany and Poland—already have similar curated repositories for their geological samples.

What sets the new U.S. facility apart is its size. Even before it opens, the repository collection includes tens of thousands of samples. Rock collections from Antarctica, with accompanying materials, have been received from Drs. Campbell Craddock, Thomas Laudon, Timothy Vick (collection of Duncan Stewart, Carleton College), Warren Hamilton, Dwight Crowder and Don Coates. Collections of past and present OSU faculty and students include those of James Collinson, David Elliot, Gunter Faure, Anne Grunow, Peter Webb, Larry Krissek, Terry Wilson, Gary Wilson, Peter Barrett, John Lindsay and William Long.

All relevant sample data will be included in the on-line Antarctic Geologic Database, found at http://bprc.mps.ohio-state.edu/agd.

The repository building itself promises to be quite attractive. A large steel sculpture depicting a partial map of Antarctica will be visible from the outside, behind a glass curtain wall, while eight 6' by 3' windows on other walls are to have laminate with Antarctic scenes, giving an effect similar to etched glass.

A small display area in the lobby will allow visitors to see some of the collection's most interesting rocks and fossils.

The $700,000 facility is being funded primarily by the National Science Foundation's Office of Polar Programs, with matching funds from various State of Ohio and Ohio State University sources. The building's artwork is partially funded by private donations.

Further information on the project can be obtained via the repository website, www-bprc.mps.ohio-state.edu/RockRep/RockRep.html, or from Rosemary Askin (askin.1@osu.edu).

For questions regarding donation of labeled Antarctic rock collections, or on future use of the collections, contact the repository's curator, Anne Grunow (grunow.1@osu.edu). ❑

Return to Stonington

by Dave Burkitt

Courtesy of Dave Burkitt

Base E, looking north, with East Base in the background. Note the glacier snout which was once the ramp down to the American base.

Editor's Note: This special report describes a recent—and rare—visit to tiny Stonington Island, located at 68°S on the east side of the Antarctic Peninsula. Stonington is the site of two former bases: the U.S.'s East Base, built during Admiral Richard Byrd's third Antarctic expedition, the U.S. Antarctic Service Expedition of 1939-41, and also used in 1947-48 by the private Ronne Antarctic Research Expedition, which included the first women to winter in Antarctica, Edith "Jackie" Ronne and Jennie Darlington; and the U.K.'s Base E, established in 1945-46 and used until 1975. After the Ronne expedition departed, the U.K. used East Base until 1975.

In January 2003, I joined the Royal Navy's ice patrol ship *HMS Endurance* when she called in at Port Lockroy. As part of the ongoing clean-up of abandoned British bases in the Antarctic Peninsula region, the ship had agreed to assist the British Antarctic Survey by putting me into the remaining bases by helicopter.

Hopefully next season will see either a major clean-up operation or removal altogether of the three sites at Danco Island, Prospect Point and Detaille Island. I wanted to make sure that any artifacts of historic interest were put aside for conservation rather than lost to the clean-up teams. Once these three sites had been checked out, the ship headed south for Marguerite Bay.

During the *Endurance*'s survey period in the area, I was flown to Stonington Island in order to carry out repairs on the British "Base E." The station was closed in 1975 and, like the American "East Base" on Stonington, has been designated an historic monument through the Antarctic Treaty.

I was last at Stonington in 1973-74, when I overwintered as a field assistant running a dog team. At the time we had around 150 huskies making up 13 regular teams plus spares, all doing various science projects down the Peninsula. So for me it was quite a nostalgic return to be able to go back and sleep in the same bunk that I'd used 30 years previous.

My companion was Alan Powley, a young man from the British base at Rothera. He'd not been there before, so the first thing we did was take a grand tour of the island, starting with a walk over to East Base.

In 1992, there had been a joint National Science Foundation/British Antarctic Survey team visit to the island to do clean up and maintenance work and set up a small museum with interpretive material in the old science building. Since then, no work has been done on either of the bases.

> *...in the evenings we sat outside, had dinner and watched the sun go down behind Neny Island.*

The "Stonington Fumigator"—the 100-mph wind which blasts down the Northeast Glacier from off the plateau—has inevitably taken its toll. Most of the roofing felt has been ripped off East Base, but considering the age of the buildings, they are in remarkably good condition—credit due to the way they were constructed back in 1940.

Two of the doors were wide open, but the island was more snow-free than I'd ever seen it, and the preceding three weeks had been very dry, so as a consequence all the huts appeared dry inside.

The museum exhibits were in good order. All recent entries in the East Base visitor book were from parties disembarked by cruise vessels, the last being from the icebreaker *Dranitsyn* two years previous. I think ice in the bay prevents visits from most tourist ships that get that far south.

Outside, two tracked vehicles—a tank and a tractor from the Richard Black (commander of East Base) expedition, which I'd not seen before—were well visible.

The ice ramp where the American dog tunnels were sited, and which joined the island to the Northeast Glacier, disappeared in the late 1970s. It's difficult to imagine all of our dog teams spanned out on that once flat area which is now a confused glacier snout of huge serac pinnacles.

We walked over to Flagstaff Hill. The pole itself is still secure, but the eastern edge is now blasted flat by the Northeast Glacier winds, the hard grain of the timber standing proud. Just beyond is the grave and memorial cross to the British lads who died in a blizzard in 1966.

We had six days of perfect calm weather. Cleaning, painting, fixing. And in the evenings we sat outside, had dinner and watched the sun go down behind Neny Island.

> *The "Stonington Fumigator"... has inevitably taken its toll.*

By the time we were due for pick-up, "Base E" was once again weathertight. We could have done with more time and materials, and further work will be required in the near future. As historic sites—East Base is the earliest remaining U.S. base in Antarctica—both will need a long-term commitment to maintain the fabric in good order.

One of the problems with Stonington Island is accessibility, and we certainly could not have gotten in by boat in January because of the ice. Perhaps another joint visit like 1992 can be organized in order to stabilize and make good these heritage sites for many years to come. It's worth considering that East Base is just a generation older than the huts of the heroic age of Antarctic exploration in the Ross Sea. ❑

Dave Burkitt first went to the Antarctic on an expedition to Elephant Island in 1970, then spent a number of field seasons on the Antarctic Peninsula with the British Antarctic Survey, as well as four field seasons on South Georgia in the 1970s. In recent years, he has spent six seasons working at the former British base at Port Lockroy, now a museum, and has also lectured aboard Antarctic tourist vessels.

Antarctic Books, Briefly Noted

Life on the Ice

Roff Smith's *Life on the Ice* (Allen & Unwin, 2002, 206 pp, Australian $29.95) is an easy read, a pleasant travelogue of his three trips to Antarctica, courtesy of the Australian Antarctic Division, the U.S. National Science Foundation, and the National Geographic Society. This is essentially a longer version of Smith's essay in the Dec. 2001 issue of the *Geographic*, with Maria Stenzel's photos replaced by about a dozen of Smith's own. Smith handsomely describes a helicopter flight up to a lonely aerie high on an Antarctic mountain where geologists collected *Glossopteris* fossils; the crystal-littered rim of Mt. Erebus; the South Pole. Of a sunwarmed rock on which he perched overlooking the Bellingshausen Sea, he writes: "The sweep of water encouraged me to believe that I could see the curve of the earth along the empty horizon." He also gets off a few good one-liners, including the particularly enjoyable "Britannia ruling the waves, and waiving the rules," after *Golden Fleece*, the private yacht on which he sailed, was deliberately snubbed by H.M.S. *Endurance*. A few errata: Smith visited not Livingstone Island and Dorien Bay, but Livingston Island and Dorian Bay. And while every American Antarctican will want to rush out and amend his/her past tax returns after reading Smith's remark, "By a quirky bit of legalese, the United States' I.R.S. grants Antarctic workers tax-free status, provided they claim on their return to have been in New Zealand's Ross Dependencies rather than simply putting 'Antarctica' as their residence," he is, unfortunately, mistaken. As the U.S.A.P. participant guide makes clear, "the I.R.S. does not consider Antarctica extraterritorial, so U.S. tax law applies." ❑

South Georgia: Gateway to Antarctica

Ludwig Kohl-Larsen's *South Georgia: Gateway to Antarctica* (Bluntisham Books/The Erskine Press, 2003, 294 pp, $45), originally written in German in 1930 and fluently translated by William Barr, is an enjoyable account of an early private expedition to South Georgia. Kohl-Larsen, a physician, first visited the island in 1911 as part of the Otto Nordenskjöld expedition, but appendicitis forced him to leave the expedition early. After marrying a daughter of Capt. C.A. Larson of whaling fame, he sailed on the first whaling factory ship, *Sir James Clark Ross*, in the Ross Sea in 1924. Kohl-Larsen and his wife and a friend returned to South Georgia in 1929, spending a summer camping, making the first film about the island, recording natural history notes and collecting rock samples. The party (along with its 70 boxes of gear!) was picked up and moved around the island at various times by the whalers, and Kohl-Larsen's descriptions of the work of the whalers—who also harvested elephant seals on isolated beaches—are interesting, though not detailed. The book's main strength is its relaxed narrative of the trio's explorations of the then still-unknown interior of the island. Anyone who has done Antarctic field research will sympathize with Kohl-Larsen's matter-of-fact lament, "We were often all agreed that the worst aspect of expedition life on South Georgia was not the loneliness, or hauling heavy sledges, but the climatic obstacles: the merciless weather in a grey, colourless desolation, and the associated and inevitable waiting in cramped tents which could last for hours, days or even weeks." But he also achieves poetry in his natural history writing, describing, for example, waves "spitting out" macaroni penguins onto slanting rocks, or "a weak moon" casting "a pale, unreal light over the glaciers." He also gamely attempts to transcribe the call of an elephant seal pup: "vue e e" or "kfa kfa hu hu" or "uo u o eee" or "hu hu hu hu hu" and "u a a a." These and many other moments make it well worth reading and re-reading. Kohl-Larsen wrote an earlier book, *Zur grossen Eismauer des Südpols* (To the great ice barrier of the South Pole) in 1926, detailing his experiences aboard *Sir James Clark Ross*. Bluntisham's publisher, David Walton, says that title is under consideration for translation and publication. It will, like this volume, be a welcome addition to a period of Antarctic history that to date has been underappreciated. With 39 black-and-white figures, two sketch maps and a large folding map inserted at rear. ❑

Antarctica, 1772-1922: Freestanding Publications Through 1999

Michael H. Rosove's *Antarctica, 1772-1922: Freestanding Publications through 1999* (Adélie Books, 2001, 537 pp, $150) simply demands superlatives. First of all, it is an especially fine-looking book, bound in quarter buffalo leather with gilt titling and linen-backed boards. Privately published in a limited edition of 500 numbered copies, each signed by the author—with a price to match—this is not a book for everyone. But no serious Antarctic collector, historian, library or research institute will want to go without it, for this is undoubtedly the *ne plus ultra* of Antarctic bibliography, a gold mine of information. Rosove, a clinical professor of medicine, spent ten years working on this project, and his obsession with detail stands out crisply on every heavy, acid-free page. He scoured private collections, bookseller's holdings and catalogues, computerized data bases, and the world's most important polar libraries and archives. The results are frankly amazing, both in the minutiae and the project's scope. As the prospectus sent to bookshops puts it: "The bibliography contains many rare and virtually unknown publications and clarifies innumerable obscure points of interest... Given are all contemporary publications (prospectuses, narratives, science) and selected post-contemporary publications (memorials, diaries, autobiographies, biographies, analyses, bibliographies, references, humanities) in all identified editions, printings, and variants, with binding and collation details, bibliographical references, ISBN, rarity, original price, and referenced commentary." With ten plates (five in color). It can be ordered for $150, plus handling & shipping ($6 domestic media mail, $15 domestic priority mail), plus $12.38 sales tax within California, by sending a check to Adélie Books, P.O. Box 3356, Santa Monica, Calif. 90408-3356. For multiple copies and international orders, inquire about shipping rates by e-mailing the author at mrosove@mednet.ucla.edu. ❑

Let Heroes Speak: Antarctic Explorers, 1772-1922

Michael H. Rosove's *Let Heroes Speak: Antarctic Explorers, 1772-1922* (Naval Institute Press, 2000, 358 pp, $35) is a good idea, well-executed. In the course of researching his massive bibliography (see above), Rosove recognized the need for a compilation of the major expeditions to Antarctica through the early 20th century. His stroke of inspiration, indicated by this book's title, was to let the explorers—through their published accounts—tell their own stories. As Rosove puts it, "I have quoted liberally from the primary sources for the purpose of conveying the quality of writing found in much of this literature... (it contains) compelling tales, beautiful images of the Antarctic and its wildlife, and descriptions of the profound spiritual effects that the magnificent continent had on the explorers who first saw it." From Cook's voyages to Shackleton's "Quest," 25 expeditions are covered, including a couple of lesser-known examples such as John Biscoe and John L. Cope; chapters range in length from three pages (Cope) to 33 (Scott's Last). The only significant omission is Shirase's Japanese expedition of 1910-12, probably because its narrative has not yet been translated into English, a deficiency that Bluntisham/Erskine publishers—see above—have announced that they plan to correct soon. In this masterful survey, Rosove at once gives us a valuable reference with fairly succinct accounts of the major expeditions and also whets our appetites to return to the primary sources (referenced with hundreds of footnotes) and savor each one individually. With 33 well-chosen black-and-white figures and six maps. ❑

Reviews by Jeff Rubin

Twisted Web by Tom Grace

Review by Cliff Bekkedahl

Polar literature—long a staid domain of gripping accounts of Polar exploration, the true life hardships visited upon man and beast as they challenged the frozen reaches north or south—now finds the next literary generation shouldering its way to the forefront. Novels! And good grief, not just any kind of novels but action novels! What is this world coming to? Well, if Tom Grace's *Twisted Web* is any measure, then Polar literature is experiencing a long overdue jump start that will liven up public interest and knowledge of that new phase of Polar exploration—scientific exploration.

Tom Grace has fashioned a new action hero, a character trained in the martial arts from service as an officer in the Navy's elite Seals. The author then transitions his character back to civilian life as CEO of his own start-up high-tech computer company with close ties to government agencies that, by intent or coincidence, entangle him and his cohorts in all kinds of nefarious international high-tech conflicts and conspiracies.

Grace's hero, Nolan Kilkenny, crackles with intellectual and physical skills and takes the reader on a fast-paced journey filled with lucid and eminently plausible scientific and leading-edge technological concepts that serve as magnets to the unscrupulous and power hungry on the international stage. Nolan Kilkenny knows whereof he speaks because his creator has done his homework in his research of the scientific and technological substance of his story. He has read the literature, he has talked and worked with the scientists and technologists in the field and, in this case, been on the Ice with a renowned expert from the National Science Foundation (NSF).

Twisted Web is the proverbial page-turner, a great read for that long flight or those sun-filled hours on the beach. Every inbound member of the wintering-over party should have a copy in his or her kit. Grace captures the Antarctic ambience—the crunching sound of footsteps in the snow, the harsh dryness of each gulp of air breathed, and the physical limitations imposed by cold that is measured several tens of degrees below the zero mark. He also understands the import of water samples drawn from Lake Vostok, miles beneath the ice cap, and how any trace of living matter in these samples could have immense implications as man struggles to unlock the mysteries of life. Nolan Kilkenny's adversaries recognize the potential in terms of wealth and power, and therein lies the story.

Twisted Web is Tom Grace's third novel featuring his high-tech hero Nolan Kilkenny. Critics already see Grace as a modern day Ian Fleming, and some say that Tom Clancy can hear his footsteps not far behind—heady praise for a young Ann Arbor, Michigan architect with an itch to write. ❑

Massive Road Hog:
Antarctic Snow Cruiser Was A Sight To Behold

Akron Beacon Journal photo

Akron Beacon Journal, 4 Nov. 2002, by Mark J. Price—The road to Antarctica ran straight through Akron.

If only the city founders had known, they might have made the streets a little wider.

The Antarctic Snow Cruiser, the world's largest automobile, rumbled over Akron's brick pavement in November 1939 en route to the South Pole.

Imagine a street parade from Chicago to Boston, but with only one giant float. That's what it was like to see the steel monster on its 1,021-mile voyage to the East Coast.

An estimated two million Americans stopped what they were doing—be it work, play or sleep—to catch a quick glimpse of the big vehicle during its travels.

The $150,000, diesel-powered cruiser, heralded as "one of the most daring scientific dreams conceived by man," was built for Adm. Richard E. Byrd's U.S. Antarctic Service expedition.

Honest to gosh, it looked like something out of Flash Gordon or War of the Worlds.

The red, orange and silver vessel was 55 feet long, 20 feet wide and 16 feet high. It had living quarters for five, a kitchen, cabin, engine room, machine shop, darkroom and storeroom.

There were enough food and supplies to last a year, and enough fuel to go 5,000 miles.

But it couldn't get there fast. The top speed was 30 mph.

The road-hogging cruiser needed just about every inch of pavement as it crossed the United States. When it approached oncoming traffic, other motorists had to pull over. A 37-ton vehicle always has the right of way.

The snow cruiser's tires, the largest the world had ever seen, were made in Akron. They measured 10 feet in diameter, weighed 1,500 pounds and were built to withstand temperatures of 75 degrees below zero.

One, in fact, was the 300 millionth tire produced by Goodyear Tire & Rubber and spent a week on display in the front window at Polsky's Department Store before being shipped to Chicago.

The cruiser was designed by Thomas C. Poulter, who had rescued Byrd from the South Pole during a 1934 expedition. Poulter wanted a giant vehicle that could roll across ice crevasses, unlike modern tractors that had to go all the way around them.

He persuaded Chicago's Armour Institute of Technology to undertake the project.

Goodyear was one of several U.S. companies to work on the vehicle, which was built in less than three months in Illinois.

Unfortunately, there wasn't a lot of time to test the vehicle. It had to be in Boston by mid-November to catch a ship bound for Antarctica.

The cruiser left Chicago on Oct. 24, 1939, slowly making its way through heavy traffic as police escorts led the way. The trip was supposed to take eight days, but problems soon arose.

For one thing, rain made the going slow. Then a truck accidentally slammed into the cruiser in Indiana. The futuristic car's fuel pump malfunctioned. Then the cruiser struck a bridge near Lima, Ohio, rolled down a hill and got stuck in a muddy ditch for nearly four days. Adding insult to injury, its fuel line burst.

The delays piled up. Akron residents heard the vehicle was on its way, but the arrival time kept getting pushed back.

As the cruiser lumbered through Mansfield, Ashland, West Salem, Lodi and Wadsworth, big crowds gathered to see it. Startled farm animals gawked at the giant intruder and bolted away.

An Akron delegation led by Mayor Lee D. Schroy met the polar roller Nov. 2 near Norton. Schroy shook hands with Poulter, who was at the controls.

It finally was here!

Word spread quickly. A line of spectators thickened as the immense car rode into Akron. It traveled along Wooster Avenue, South Hawkins, Mull Avenue and West Exchange. At Rose Boulevard, the vehicle pulled over to pick up Goodyear Vice President E.J. Thomas.

Police pushed back the crowds as the cruiser entered downtown Akron. At Main and Exchange, it stopped again to pick up Goodyear President P.W. Litchfield and his two grandsons.

The cruiser rolled past the tire company's headquarters on East Market and then headed south to the Goodyear air dock, where Poulter picked up two spare tires and parked for the night. A massive crowd visited the air dock that evening to take a peek at the strange machine.

"Tens of thousands of Akronites flowed onto the airport and into the dock, jamming traffic for blocks around the vicinity," *Akron Beacon Journal* writer Anthony Weitzel reported. "There were boys and girls in that crowd, and men and women carrying infants, grandmothers hobbling through the wet grass, and grandfathers helping them."

Poulter begged off a banquet that had been organized in his honor at the Mayflower Hotel. He was too tired. He just wanted to go to sleep.

The next day, the Antarctic Snow Cruiser crept out of Akron and continued eastward, never to be seen again in these parts.

It rambled into Boston on Nov. 12, bringing New England traffic to a screeching halt.

The beast crawled to the wharf, where it was hoisted aboard the ship North Star.

The 'eight-day trip' had taken 19 days.

The ship and its precious cargo arrived at Antarctica's Ross Ice Shelf on Jan. 12, 1940. After the cruiser was unloaded, Poulter made a terrible discovery.

The car was far too heavy.

Its wheels became stuck in the snow. The engines weren't powerful enough to break free. The Goodyear tires spun around and around.

The flawed machine would do little exploration. It couldn't go far without getting stuck.

The best thing that could be said about the immobile home was that it provided a nice shelter from the cold.

As it turned out, the greatest adventure turned out to be that trip from Chicago to Boston.

But even if the vehicle had worked according to plan, it wouldn't have mattered. After the U.S. entered World War II, the polar expedition was scrapped. The crew returned home and the Antarctic Snow Cruiser was abandoned on the ice shelf.

The cruiser's whereabouts remain a mystery today. It might be buried under ice and snow, waiting to be rediscovered by future explorers. Or it could be resting at the bottom of the sea, a casualty of melting ice and a collapsed shelf.

The road to Antarctica ran straight through Akron.

But who knew it was going to be a dead end?

❑ *(cb Thomas W. Schmidlin)*

EDITOR'S NOTE: Anyone who can shed any light on the ultimate disposition of the Snow Cruiser is invited to write to the *Polar Times*.

Antarctic Notes

edited by Jeff Rubin

Woman Seeks Brother's Icy Grave

Chicago Tribune*, 25 April 2003, by Rex W. Huppke**—Locked in the ice of Antarctica are the bodies of three Navy airmen who died in 1946 during Operation Highjump. Radioman 1st Class Wendell Hendersin, navigator Maxwell Lopez and flight engineer Frederick Williams perished when their Martin Mariner PBM-5 seaplane, "George One," crashed into Thurston Island after taking off from USS *Pine Island*. The six surviving crewmen buried the dead, then waited 13 days for rescue. Now Hendersin's sister, Betty Spencer, wants the bodies retrieved. "We just feel these guys deserve to be recognized," she says. "And we'll keep on pushing to try to get them home." The U.S. Geological Survey estimates that the bodies are about 150 to 260 feet under the ice. Michael Wardlow, head of the Navy's casualty branch, said a recovery mission is "being looked at very seriously." In the early 1990s, a private expedition salvaged a P-38 Lightning fighter that crashed in Greenland during World War II by using a heated drill to bore through 260 feet of ice in an operation that took years and cost millions of dollars. Bill Kearns, 79, one of two surviving "George One" crewmen, opposes any effort to recover his comrades' corpses: "There they are in beautiful, pristine white snow, and they'll be there forever. I would prefer that for myself rather than be stuck in a grave someplace." ❑ ***(cb Scott Rubin)

Tourist Diver Dies at Half Moon

***Antarctic Non-government Activity News*, 30 January 2003, by Martin Betts**—A scuba diver from the tourist vessel *Grigory Mikheev* died at Half Moon Island in the South Shetlands on 27 Jan. The man was one of nine Latvian tourists making their first dive on a planned 12-day voyage. Oceanwide Expeditions, the operators of *Mikheev*, said the man was observed to have been "breathing fine" when he began the dive. He was later found on the sea floor at a depth of 20m. While government programs have conducted scientific diving for many years, Antarctic tourist diving only began in 1998. ❑

Long Distance Swims in Antarctica

***Antarctic Non-government Activity News*, 1 January 2003, by Martin Betts**—US long-distance swimmer Lynne Cox made two swims from a tourist ship in Antarctic waters last month. The first was made in Admiralty Bay on King George Island on 13 Dec. and the second in Neko Harbour two days later. Both swims were made from the US-based Quark Expedition's ship *Orlova* . The Admiralty Bay swim covered 1,500m, the landing being made at the Polish station Arctowski. The 25-minute swim in Neko Harbour covered 1,900m in water 0.5 deg. C. Cox was reported to have "emerged smiling and shivering" from the water. Her body temperature was measured at 35.2 deg. C. when she stepped ashore, but within an hour it had reportedly risen to normal. Cox wore a standard women's bathing suit during both swims. She previously swam the English Channel, and between the Bering Strait's Diomede Islands. ❑

(EDITOR'S NOTE: an excellent article by Cox about her swim and her body's unique physiological response to cold water appeared in the 3 Feb. 2003 *New Yorker* magazine.)

***Antarctica* is Fine Art Book**

Millionaire Magazine*, Spring 2003, by Ric Osuna**—In 2002, *Antarctica*, published by Pat and Rosemarie Keough, was unveiled at Saint James's Palace at a reception hosted by Prince Charles. Royalty from across the globe are among the collectors who already have acquired this 336-page, $2,900 book, which weighs 27.5 pounds in its archival box and is elegantly bound in fine goat leather. It includes 330 color photos and a 15-page narrative. The Keoughs spent three years creating their masterpiece, which has won the Benjamin Franklin Award, the Oscar for the international printing and graphics community. Each of the 1,000 copies is autographed by Queen Noor of Jordan, honorary president of Birdlife International. All net proceeds of *Antarctica* will help fund the foundation's "Save the Albatross" campaign. For more information, visit www.keough-art.com ❑ ***(cb Billy-Ace Baker)

Russia Shutters Vostok

***Nature*, MOSCOW, 13 March 2003, by Bryon Macwilliams**—Thirteen crew members from Russia's inland Vostok station are expected to arrive this week at Mirny station on the coast. When Vostok ran out of fuel and supplies last month, the team was forced to take their Soviet-era trucks on a 1,400-km journey across one of the coldest regions on Earth. Vostok was abandoned for the winter on 28 Feb. after bad weather prevented a convoy carrying fuel and supplies from reaching it. Valery Lukin of the Arctic and Antarctic Research Institute in St. Petersburg, says that trips to the base have been disrupted since a supply ship attempting to reach Mirny became trapped in ice last year.The crew's convoy was briefly stranded on 5 March when one of the trucks broke down, but it is expected to arrive at Mirny by 15 March. The same personnel are scheduled to reopen the base in early November. Lukin says that a proposed international project to drill into Lake Vostok will not be affected. The base has shut three times before in its 45-year history, with two of those closures in the past decade. "This in no way means that Russia can't financially support its base," Lukin says. "It is related to the climatic conditions." ❑

Antarctic Study Points to Rising Sea Levels

New York Times*, 7 March 2003, by Andrew C. Revkin**—New evidence from a rapidly warming part of Antarctica suggests that ice can flow into the sea much more readily than had been predicted, perhaps leading to an accelerated rise in sea levels from global warming. In the new study, to be published today in the journal *Science*, two Argentine researchers report on aerial surveys they conducted in 2001 and 2002, which found that the collapse of the sprawling Larsen A ice shelf in 1995 led to a sudden surge in the seaward flow of five of the six glaciers. Geological evidence shows no signs of similar ice breakups along the Peninsula in many thousands of years, the researchers and other experts said. Indeed, the recent disintegration of ice shelves along both coasts of the Peninsula—with another one, Larsen C, poised to go next—has come after thousands of years of stability, said Pedro Skvarca, an author of the study and the director of glaciology at the Antarctic Institute of Argentina. "We are witnessing a very significant warning sign of climate warming," he said. Other experts said the long-term risk of rising sea levels was still unclear. But they added that the new study underscored the importance of clarifying the relationship between Antarctica's many fringing ice shelves and the glaciers behind them. The other author was Hernán De Angelis, a geologist at the Argentine institute. Both researchers contributed last year to a study that provided the first indications of the accelerating slide of these glaciers, but this analysis provides new detail, they said, including images of terraces of "stranded ice" stuck 60 to 100 feet up on slopes that showed the glaciers' elevation just a few years ago. ❑ ***(cb Billy-Ace Baker)

Penguin Dads' Secret Revealed

***New Scientist*, 22 February 2003, by Emma Young**—Male king penguins store undigested food in their stomachs for up to three weeks. The talent is unique among higher vertebrates and ensures a constant supply of food for their chicks. Now an analysis of the birds' stomach contents shows the penguins keep food fresh by destroying bacteria in their stomachs, suggesting that they produce an antibacterial agent in their digestive tracts. Males use their stomach contents to feed chicks when bad weather delays the female returning with food. Tests on seven males on Possession Island (in the Crozets) that were incubating eggs and conserving food showed that their stomach temperatures and pH were ideal for bacterial growth, says Cecile Thouzeau at the CNRS, France's national research organisation. The birds' diet of fish and squid should produce an abundance of gastrointestinal microbes. But when Thouzeau's team looked at samples from penguins conserving their food, it found many more dead or non-viable and malformed bacteria than in samples from birds that were digesting their meals.The birds appear to be able to switch on the preservation process, suggesting that they actively release one or more bactericides. Journal reference: *Polar Biology* (vol 26, p 115) ❑

'Colossal Squid' Caught in Ross Sea BBC News Online, WELLINGTON, 2 April 2003, by Kim Griggs—An enormous squid was caught recently in the Ross Sea,virtually intact from the ocean surface. Although the species was first identified in 1925, only six specimens have ever been recovered: five from the stomachs of sperm whales, and a sixth caught in a trawl net at a depth of 2,000 to 2,200 metres. Said New Zealand squid expert Dr. Steve O'Shea: "The giant squid is no longer the largest squid that's out there. We've got something that's even larger, and not just larger but an order of magnitude meaner." The specimen has a mantle length of 2.5 metres, larger than any giant squid mantle Dr O'Shea has seen, and, he believes, it is still immature, and will grow to a length of 4 metres, compared to the giant squid's maximum 2.25 metres. ❑

WAIS May Vanish in 7,000 Years

Associated Press*, WASHINGTON, 3 January 2003, by Paul Recer**—A natural cycle of thawing may cause the West Antarctic Ice Sheet (WAIS) to melt away in 7,000 years, possibly causing a worldwide sea level rise of about 16 feet, according to new research. In a study appearing Friday in the journal *Science*, researchers say that geochemical measurements of when mountainside rocks in western Marie Byrd Land first become free of ice show that the WAIS began melting about 10,000 years ago and is still shrinking. "There was a gradual and continuous melting," said John O. Stone, first author of the study and a professor of geology at the University of Washington, Seattle. Over thousands of years, he said, the ice has retreated at the rate of about 2 inches a year in a steady pattern that shows no sign of slowing. "Our measurements suggest a steady rate of melting, but we couldn't rule out short, rapid events," Stone added. "The pattern we see is very steady and continuous...We've had 10,000 years of climate much like it is today and the ice sheet has been shrinking continuously during that time." ❑ ***(cb Billy-Ace Baker)

Antarctic Lake Yields Ancient Bacteria

Associated Press*, WASHINGTON, 17 December 2002, by Paul Recer**—Bacteria and algae frozen for more than 2,800 years in ice capping an Antarctic lake returned to life after thawing in a laboratory. A team led by Peter Doran of the University of Illinois at Chicago drilled through more than 39 feet of ice to collect microscopic bacteria and algae from Lake Vida in the Dry Valleys. "When we brought them back and warmed them up a bit, they sprang back to life," said Doran in the *Proceedings of the National Academy of Sciences*. Doran said even older microbes may live deeper in the ice sheet sealing Lake Vida, and in the briny water below the ice, which will be sampled in a 2004 expedition that will test techniques that may one day be used in Lake Vostok and on Mars. Doran said the researchers will suck up samples of the water into a sealed airlock: "We don't want to contaminate the lake. If we find life in the lake, we want to make sure it was living in the lake and not on our instruments." ❑ ***(cb Billy-Ace Baker)

Gardener Conjures Antarctic Veggies

Associated Press*, 8 January 2003, by Dean Fosdick**—Robert Taylor may have the coolest job of any gardener on Earth: resident greenhouse technician at McMurdo. Taylor, 34, provides the station with cucumbers, peppers, tomatoes, limes and more. "What you will not see is a house plant, or even a flower that you can't shove in your mouth without suffering adverse reactions," Taylor said. "Everything grown (here) is for the purpose of eating." Life blooms under thousands of watts of artificial light in just 650 sq. ft. of growing space. Hydroponics produces an annual harvest of 3,600 pounds. Since importing insects is forbidden by the Antarctic Treaty, Taylor hand pollinates. "Lettuces grow like champs," he says. "There are nearly 900 lettuce heads growing at any time on tiered growing systems. Likewise, basil and parsley need very little in the way of input. Pansies are the flowers of choice: in addition to their retina-burning colors, they taste great." ❑ ***(cb Billy-Ace Baker)

U.S. Helo Crash

National Science Foundation press release*, 17 January 2003, by Peter West**—A 7-passenger Bell 212 helicopter crashed near McMurdo on Jan. 16, injuring the pilot and a passenger, the only people aboard. The two were evacuated to N.Z. aboard a New York Air National Guard LC-130 for medical treatment. Medical personnel accompanied the injured on that flight. The helicopter was shuttling cargo to science stations in the Dry Valleys. Petroleum Helicopters Inc., of Lafayette, La., operates NSF's helicopter fleet in Antarctica, flying approximately 1,400 hours each season. This is the first aircraft accident with serious injury for the U.S. Antarctic Program since PHI assumed responsibility for helicopter flight operations from the U.S. Navy in 1996. ❑ ***(cb Billy-Ace Baker)

Harnessing Wind to Power Mawson

Mercury online*, 13 January 2003, by Michelle Paine**—Antarctica's howling winds could power Australian station Mawson in as little as five years. After 10 years and $6 million in preparation, three giant turbines from German company Enercon travelled aboard *Polar Bird* to Mawson. Weather permitting, two of the three should be churning out power in five weeks, and the wind farm could replace 500,000 litres of diesel. The towers are built to withstand 300km/h winds and the strongest are usually 250km/h. Australian officials hope wind power will one day supply nearly all of the stations' energy needs. ❑ ***(cb Billy-Ace Baker)

Antarctica Now Scheduled Air Stop

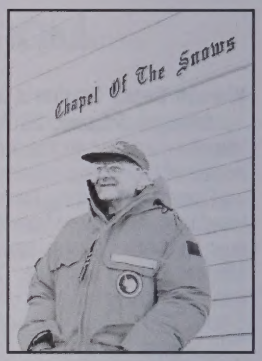
New York Times*, 5 January 2003, by Joshua Goodman**—Twice-weekly commercial flights from Argentina operated by the Argentine air force will begin service on Thursday from Ushuaia to the country's Marambio scientific base at Seymour Island. The 70 passengers on the Hercules C130 will take a three-hour tour of Antarctica. The excursion's $630 price includes dinner in Ushuaia as well as the flights. Once at Marambio, passengers will take a walk with English-speaking guides, followed by a light lunch, before reboarding for the 2.5-hour flight back to Ushuaia. The Argentine venture is the first to land tourists on the continent by air on a regular noncharter basis. The excursion is organized by Aerored, a Buenos Aires-based travel company, in association with the Argentine air force's commercial airline, Lineas Aéreas del Estado (LADE). For more information: www.aeroredes.com.ar. ❑ ***(cb Billy-Ace Baker)

Ancient Flies in Antarctica

***C.N.N.*, 9 May 2003, by Marsha Walton**—The tiny fossil of a fly discovered 300 miles from the South Pole could help scientists figure out what life was like millions of years ago in Antarctica. The find by geologist Allan Ashworth, detailed in this week's journal *Nature*, could open a new chapter in the understanding of plant and animal life in ancient Antarctica and shed light on global climate change. Until now, scientists did not think that the coldest continent ever harbored this type of flies, from the Cyclorrhapha family, so-called "higher flies" that include the common housefly, said Ashworth, a geology professor at North Dakota State University in Fargo, who found the fossil in rocks he had collected in the Meyer Desert Formation on the Beardmore Glacier. The flies could have existed during a warm spell several million years ago or could have been part of the animal life of the mega-continent Gondwana. ❑

The Rev. John Coleman

NSF Press Release, May 2003— ***Statement by Dr. Karl Erb Head of the U.S. Antarctic Program On The Death of the Rev. John Coleman:***



Rev. John Coleman

On behalf of the men and women of the U.S. Antarctic Program, I would like to express our sadness at the death of the Rev. John Coleman, who served as the Catholic chaplain at McMurdo Station for almost 20 years. John died of cancer in Christchurch, N.Z., on May 9 at the age of 71.

Since 1985, in the face of the harsh conditions and isolation that go hand-in-hand with service in Antarctica, he had been a source of inspiration and a steadying presence "on the Ice." While John's ministry included a parish in his native New Zealand, he was best known to those of us in the program as our genial priest in a parka. In the station's Chapel of Snows, but also in the dining hall and almost anywhere else people gathered in "Mactown," John lent his ear to anyone who needed his understanding and guidance, recognizing that beyond the physical strain of Antarctic service, life at McMurdo can sometimes place a great deal of stress on families and marriages. "We're not just about God," John once said of himself and the other spiritual leaders in McMurdo. "We're about the needs of people." We are all very grateful to him for doing just that. ❑

David Lewis

***The Times*, LONDON, 16 December 2002**—David Lewis, yachtsman and adventurer, died in Gympie, Queensland, Australia, on October 23, 2002, aged 85. His epic voyage as the first yachtsman to sail alone to Antarctica captured the public's imagination.

It began when Lewis set sail from Sydney in "Ice Bird," a 32ft steel sloop, on October 19, 1972, bound for the Antarctic Peninsula some 6,000 miles away. Capsized and demasted only six weeks out from Australia, Lewis sailed on under jury rig with hands crippled by agonising frostbite. Despite a second capsize, he duly made landfall after 14 weeks, arriving at the US Palmer base in Antarctica, where he brought up alongside Cousteau's "Calypso." There he repaired "Ice Bird," and the next year continued his voyage through pack ice, fog andicebergs. Once again the yacht capsized, and it was a battered vessel and an exhausted man that finally reached Cape Town. Lewis recalled his adventures and the depths of despair to which he sank in his book "Ice Bird" (1975). The voyage was described by one reviewer as "the greatest small boat voyage into ice since Shackleton's." ❑

(Editor's Note: Lewis returned to the Antarctic in the austral summer of 1977-78 in the yacht "Solo" with an eight-person expedition mounted by the Oceanic Research Foundation, described in his 1979 book "Voyage to the Ice.")

Stolen Biscuit Returned to Scott's Hut

A guilty conscience has driven Thomas Keneally, the best-selling Australian author of the novel "Schindler's List" and two books about Antarctica, to return a biscuit that he took from a tin on the floor of Capt. R.F. Scott's Discovery Hut during a visit in 1968.

Although he was subsequently mortified by his act, the author was not alone in pilfering. Over the years, visitors have stripped the 1902 hut of most of its contents, including sledges, skis, penguin skins and home-made chessmen.

"At the time, these huts looked like doomed structures — they were half full of ice," Keneally said of his initial visit. "All of this made it very tempting to take something. So I helped myself to one of Scott's Huntley & Palmers 'hard tack' biscuits - two-thirds of a biscuit, to be precise. It's been on my conscience ever since."

For most of the past 35 years, Keneally, 68, has had the biscuit on display in his Sydney home, mounted in a glass case - a guilty reminder of what he calls his past "vanity, venality and folly."

Two months ago, he and his wife returned to McMurdo Sound on the tourist ship *Kapitan Khlebnikov*. "I'd always intended to take the bickie back," he said. "This was the opportunity I'd been waiting for."

But he forgot to pack it and, after meeting New Zealand Antarctic Heritage Trust executive director Nigel Watson, sent it to him in Christchurch by courier.

Mr Watson said he was delighted with the act, which should be a signal to the many Antarctic visitors who took souvenirs from Scott's Hut in the 30 years before the trust began restoration.

Keneally said the whole attitude towards heritage sites had changed: "I admire the endeavours of the trust to look after the huts. The huts are the most human dimension of the Antarctic. I would hope my grandchildren will go there and see the things those people left behind."

He was never tempted to eat the biscuit. "It never occurred to me to taste the thing," he said. "I'm positive it would be quite disgusting." —*Compiled from reports in the (London)* Daily Telegraph *(11 May 2003) and the* Christchurch Press *(17 May 2003).*

Membership Letter

We continue to add members, but less rapidly than needed to reach the goal of 2000 by next year. Please do what you can to help the Society attain critical mass so we can better accomplish our mission.

The program of wide distributin of promotional copies of The Polar Times continues. For this issue, in addition to 1155 copies being mailed to regular or corporate members, we'll distribute 845 free copies to academic institutions, polar ships and bases, and other selected recruiters.

Each copy of this issue left our New Jersey printer with an insert of four Business Reply Cards. Please treat them with respect and try to facilitate their use in the recruitment of new members. Two of the cards are intended for use by current members wishing to give gift memberships at the bargain price of $9 each for the last half of 2003 and all of 2004. The other two cards are for use by nonmembers wishing to join at the special introductory rate of $20 for the last half of 2003 and all of 2004.

I hope to see many of you at the Symposium in Columbus in October. Best wishes,

Bob Kremenak

APS Membership Center • P.O. Box 464 • Iowa City, IA 52244-0464
ph 319-338-3457 • email: ampolars@mchsi.com

Behrendt Elected an AAAS Fellow

Senior Researcher John Behrendt of CU-Boulder's Institute of Arctic and Alpine Research was elected an AAAS Fellow. He was cited for his distinguished contributions to the understanding of crustal controls in the Antarctic Ice Sheet and for efforts to protect and manage Antarctica for the scientific benefit of all nations. Behrendt was presented with the award on Saturday, Feb. 15, 2003 at the Fellows Forum held during the 2003 AAAS annual meeting in Denver. ❑

contents

Northern Alaska: A Crucible for Science 3
Dinosaurs of Arctic Alaska 4
Dr. George A. Llano Dies While Aboard Tour Ship ... 5
Arctic Dinosaurs—Inauguration to Field Work 6
Dinosaurs of the North 8
Due North 9
Reflections on a Fallen Alaska Star 10
Polar Extremes: The World Of Lincoln Ellsworth ... 11
"Jenny's Class" P.S. 234, NYC Public School 11
Camp Century Revisited 12
Barrow Senior Awarded Honorary Doctorate 14
Tundra Reveals Oldest DNA 14
Arctic Oil and Gas Digest 15
Centerfold 16-17
Train Oil and Snotters: Eating Antarctic Wild Foods 20
South Pole Station Construction Update 22
Due South 23
Around and Around She Goes... 24
U.S. Polar Rock Repository to Open in October 25
Return to Stonington 26
Antarctic Books, Briefly Noted 27
Massive Road Hog 28
Antarctic Notes 29
Obituaries 30
Stolen Biscuit Returned to Scott's Hut 31
Behrendt Elected an AAAS Fellow 31

Major Contributors In This Issue

Peter Anderson • Billy-Ace Baker
Peter Barretta Jr. • Nathan J. Frank
Abel Shafer

CORRECTION: *Due to an editing error, the first paragraph of Dick Wolak's Old South Pole Station story in the last issue was garbled. It should have read:*

"'We are living at the South Pole,' proclaimed the *National Geographic* magazine of July 1957. And so they were, at the new research station built for the start of the International Geophysical Year (IGY) of 1957-58."

AMERICAN POLAR SOCIETY Membership is a great gift!
Take advantage of our current SPECIAL RATES!
• See insert for details •